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Financial Integration, Productivity and Capital Accumulation

Alessandra Bonfiglioli

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Alessandra Bonfiglioli†
Institute for Economic Analysis, CSIC

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Abstract

Understanding the mechanism through which financial globalization affects economic performance is crucial for evaluating the costs and benefits of opening financial markets. This paper is a first attempt at disentangling the effects of financial integration on the two main determinants of economic performance: productivity (TFP) and investments. I provide empirical evidence from a sample of 70 countries observed between 1975 and 1999. The results for both *de jure* and *de facto* indicators suggest that financial integration has a positive direct effect on productivity, while it does not directly affect capital accumulation. I control for indirect effects of financial globalization through financial development and banking and currency crises. While the evidence on financial depth as an indirect channel is weak, the results are more robust for financial crises: they depress both investments and TFP, and are favored by financial integration, though only to a minor extent. The overall effect of financial liberalization is positive for productivity and negligible for investments.

JEL Classification: G15, F43, O40, C23

Keywords: Capital account liberalization, financial development, financial crises, growth, productivity, investments.

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†Address: Institut d'Analisi Economica CSIC, Campus UAB, 08193 Bellaterra, Barcelona, Spain. Phone: +34 93 592 9762. E-mail: alessandra.bonfiglioli@iae.csic.es.

1 Introduction

Academic economists and practitioners have long debated over the effects of financial globalization on growth.[1] The removal of restrictions on international capital transactions has on some occasions been welcome as a growth opportunity and in others blamed for triggering financial instability and crises. Yet, this debate has not addressed empirically the mechanism through which financial liberalization affects growth. How do the main sources of growth - total factor productivity (TFP) and capital accumulation - react to financial globalization? This issue is of particular relevance for at least two reasons. First, understanding how TFP and investments are affected by financial liberalization would allow us to identify which models are more appropriate to analyze and predict the economic effects of financial globalization. Second, answering the question above would greatly help understand the welfare effects of financial integration. Gourinchas and Jeanne (2006) show that, whether capital or TFP react to financial openness, matters significantly for the size of welfare gains (or losses).[2] There are, to my knowledge, no studies that address this important issue. This paper is a first attempt at disentangling the effects of financial globalization on productivity and capital accumulation.

The theoretical literature proposes various mechanisms through which financial globalization may affect economic performance. In a standard neo-classical framework, opening international capital markets generates capital flows from capital-abundant towards capital-scarce countries, thereby affecting growth in the poor countries through an acceleration in the convergence process. This effect however is short-lived, since the steady state (or the balanced growth path) is not affected. This argument would find empirical support if capital accumulation in poor countries accelerated after financial liberalization, and TFP did not react. If credit rationing were added to the neo-classical framework above, also productivity might be expected to increase, to the extent that capital inflows make more productive investments possible by relieving the economy from credit constraints (as in Acemoglu and Zilibotti, 1997). The findings (e.g. in Lucas, 1990) that capital does not flow from rich to poor countries though, seems to make these mechanisms less likely to apply. International capital mobility may also allow investors to diversify risks by holding foreign assets, as suggested by Obstfeld (1994). Better portfolio insurance fosters investments in risky projects with high expected productivity, as well as savings.

[1] Here financial globalization is meant to be the absence of restrictions to international financial transactions. Henceforth, I will equivalently refer to it as (international) financial liberalization, financial integration, or financial openness.

[2] Their quantitative exercise points out that the benefits from an acceleration in capital accumulation along the convergence to the steady state, are way smaller (up to a fiftieth) than the gains from an improvement in productivity, hence in the steady state to which the economy converges.

While higher savings would imply a positive effect on capital accumulation, the outcome of international portfolio reallocation on capital and productivity would vary across countries, hence be undetermined on aggregate. Yet another approach could be considering financial globalization similar to trade in goods. By exerting a pro-competitive effect on the capital markets, financial openness would induce firms of all countries to use capital more efficiently, thereby raising productivity without necessarily causing capital flows across countries. As trade in goods, financial integration might also foster specialization in financial services, which would improve allocative efficiency by allowing firms to borrow at better conditions through specialized foreign intermediaries. Also, by giving firms access to a wider range of financial services, integration may allow them to use the most appropriate ones, thereby gaining in efficiency.

All of these models support the view that financial integration affects positively economic performance. However, in a world characterized by market imperfections and weak institutions, financial integration could open the door to speculation, misallocation of capital and financial instability (as for instance in Rodrik, 1998 and Stiglitz, 2000), thereby leading to bad economic outcomes.

The models above give different predictions on the effects of financial globalization on productivity and capital accumulation. If openness only promotes capital inflows to capital-scarce countries, thereby accelerating convergence, its positive effect is expected to be short-lived. If instead it raises TFP, it is most likely to spur long-term growth. Understanding what model is supported by the empirical evidence may be of great help to assess if financial globalization has temporary or long-lasting effects on the wealth of nations.

To investigate the mechanism through which international financial liberalization affects capital accumulation and TFP, I control for two indirect channels. First, financial globalization may foster financial development (see Klein and Olivei, 1999), i.e. the availability of external finance to the private sector, which Beck et al. (2000) show to affect positively productivity but not investments.[3] To disentangle this channel, I first include in the regressions for TFP and capital a measure of financial depth, such as the ratio of credit to the private sector over GDP. Next, I separately address the links between financial integration and financial depth, and between the latter and the sources of growth.

As another indirect effect, financial liberalization may trigger financial instability, as a wide literature points out (see Aizenman, 2001 for a survey on the evidence on financial

[3] Financial development can be defined as the ability of a financial system to reduce information asymmetries between investors and borrowers, trade and diversify risk, mobilize and pool savings, and ease transactions. Removing restrictions on international financial transactions (financial liberalization) may affect the way a financial system carries over its functions, hence financial development.

liberalization and crises). Whatever the mechanism generating banking and currency crises, such events may harm the ability of a financial system to provide the economy with credit. As a consequence, both investments in physical capital and innovation can be expected to slow down. In the worst scenario, TFP might even drop, due to the need for shutting down productive projects. I account for the effects of financial instability by controlling all regressions for indicators of banking and currency crises. In this way, any indirect effect of liberalization through crises is removed from the estimates for the index of financial liberalization. I also estimate the joint effect of crises and liberalization and I explicitly address the link between financial liberalization and financial crises by means of probit regressions.

I follow three methodologies to assess the effects of financial liberalization and financial crises on investments and productivity, and a fourth to address the link between liberalization and crises. Using a *de jure* zero-one indicator of capital account liberalization provided by the IMF, I perform difference in differences estimation of the impact of regime switches, between capital restrictions and openness, and between crises and normal times. To this end, I use a panel data with yearly observations from at most 70 countries over the period 1975-1999. I then turn to the long-run analysis and estimate equations for TFP and capital growth rates as a function of initial conditions, financial openness and the other controls on a cross-section of 69 countries over a time span of 25 years. To overcome problems of unobserved country-specific effects and endogeneity of regressors, typical of cross-sectional estimates, I apply the system GMM dynamic panel technique proposed by Arellano and Bover (1995) and Blundell and Bond (1998) on data at five-year frequency. To assess whether financial liberalization favors the occurrence of financial crises, I estimate on the annual panel dataset a series of linear probability models for an indicator of systemic and borderline crises (from Caprio and Klingebiel, 2003), and a dummy of currency crises (from Glick and Hutchison, 2000). As a robustness check, I replicate the estimates on the 5-year panel and the cross-section using Quinn's (2007) more nuanced *de jure* measure of capital account liberalization. Moreover, to further assess the robustness of the results, I regress, at all frequencies, TFP and capital growth rates on a *de facto* indicator of financial integration provided by Lane and Milesi-Ferretti (2007): the gross external position (total foreign assets + liabilities) as a ratio of GDP.

The main results are the following. (1) International financial liberalization has a positive direct effect on TFP, especially in developed countries. (2) The direct effect on capital accumulation is nil in the medium and long run, negative at annual frequency. (3) Banking and currency crises generally harm both capital accumulation and productivity. However, (4) financial liberalization raises only the probability that minor banking crises

occur in developed countries and has virtually no effect on the likelihood of currency crises. (5) There is weak support for the hypothesis that financial integration affects productivity and investment by promoting financial depth.

This paper is mainly related to four strands of literature. The studies on growth and development accounting has shown that a large share of cross-country differences in economic performance is driven by total factor productivity (TFP) rather than factor accumulation (physical and human capital).[4] Hall and Jones (1999) point out that a substantial share of the variation in GDP per worker is explained by differences in TFP and provide evidence that productivity is to a large extent determined by institutional factors. Klenow and Rodriguez-Clare (1997) show that also GDP growth differentials are mainly accounted for by differences in the growth rates of TFP. These results suggest that, if financial globalization is to affect the wealth of nations, it is more likely to do it through its impact on TFP, rather than factor accumulation. This is indeed the main empirical result of the paper.

Several authors suggest that financial development spurs GDP growth by fostering productivity growth, not only by raising the funds available for accumulation. Theoretical papers by Acemoglu, Aghion and Zilibotti (2005), Acemoglu and Zilibotti (1997), Aghion, Howitt and Mayer-Foulkes (2005b) among others show that financial development may relieve risky innovators from credit constraints, thereby fostering growth through technological change. While earlier contributions (e.g., Greenwood and Jovanovic, 1990) suggest that financial development spurs growth simply by increasing participation in production and risk pooling, in more recent works the relationship is also driven by advances in productivity. King and Levine (1993), and, in more detail, Beck Levine and Loayza (2000) show evidence of a strong effect of financial development on TFP growth, and only a tenuous effect on physical capital accumulation. This paper, similarly in spirit to Beck et al. (2000), analyzes separately the effects of financial integration on TFP and investments. Moreover, it partially encompasses their exercise, by assessesing whether financial depth works as an indirect channel through which globalization affects productivity and capital accumulation.

Many papers, extensively summarized in Prasad et al. (2003 and 2006) address the effects of financial globalization on economic growth and volatility, from different perspectives and with various datasets and empirical methodologies. Some studies (for instance, Grilli and Milesi-Ferretti, 1995, Kraay, 2000 and Rodrik, 1998) find that financial liberalization does not affect growth, others that the effect is positive (Quinn, 1997, Levine, 2001

[4] See Caselli (2005) for a survey on the develpment accounting literature, and Easterly and Levine (2001) for the stylized facts on development and growth accounting.

and Bekaert et al., 2005 among others), yet others that it is negative (Eichengreen and Leblang, 2003). These effects are also shown to be heterogeneous across countries at different stages of institutional and economic development (see Bekaert et al., 2005, Chinn and Ito, 2003 and Edwards, 2001), with different macroeconomic frameworks (Arteta Eichengreen and Wyplosz, 2001), and adopting a different sequence of other financial reforms (see Kaminsky and Schmukler, 2002 and Bekaert et al., 2005). Perhaps surprisingly, very little evidence exists on the effects of financial globalization on the main sources of growth: productivity and capital accumulation.[5] Chari and Henry (2002) find significant effects of equity market liberalization on investments and the Tobin's Q of listed firms, and conclude that these must be driven by changes in productivity, which they do not explore directly. A call for studies on the relationship between financial globalization and productivity is in Kose et al. (2006).

The link between financial globalization, crises and growth has been widely debated during the last twenty years. A series of empirical contributions (see Kaminsky and Reinhart, 1999 and Glick and Hutchison, 2000) provide evidence that the occurrence of currency and banking crises is associated to the absence of capital account restrictions. Works by Leblang (2003) and Bordo et al. (2001) however find financial liberalization to be negatively correlated with the onset of currency crises. A recent work by Glick, Guo and Hutchison (2006), shows that once the "self-selection" bias is addressed by means of a matching and propensity score methodology, capital account liberalization lowers the probability of currency crises. The present paper does not aim at studying in depth the determinants of financial crises. Rather, I perform probit estimations for the occurrence of banking and currency crises in order to evaluate the overall effect of financial integration on productivity and capital accumulation.

The remainder of the paper is organized as follows. Section 2 briefly introduces the empirical strategy, and describes the dataset and the variables used in the analysis. Section 3 presents the econometric methodologies and reports the estimation results for capital and TFP. Section 4 investigates further the indirect effects of financial integration through financial crises and financial development. Section 5 discusses the evidence in the previous sections and proposes an explanation that is in line with the results of other empirical studies. Section 6 concludes.

[5] Some preliminary evidence on financial integration and productivity is in Kose, Prasad and Terrones (2006).

2 Empirical strategy and the data

The previous studies on the impact of financial liberalization on growth have estimated various versions of the equation:

$$dy_{it} = b_0 + b_1 y_{it-1} + b_2' \mathbf{Z}_{it} + b_3 IFL_{it} + e_{it}, \tag{1}$$

where $dy_{it} \equiv d\log(Y_{it})$ is the growth rate of GDP in country i, y_{it-1} is the logarithm of lagged GDP, $\mathbf{Z}_{it}$ is a vector of control variables, IFL_{it} is an indicator of financial liberalization, and e_{it} is the error term.

The literature on growth and development accounting has shown total factor productivity (A) and capital (K) accumulation to be the main determinants of cross-country differentials in GDP growth rates. This paper, instead of considering Y, focuses on its main components and proposes estimates of the following equation:

$$P_{it} = \beta_0 + \boldsymbol{\beta}_1' \mathbf{X}_{it} + \gamma IFL_{it} + u_{it},$$

where P_{it} represents in turn A, K or their growth rates in country i at time t, $\mathbf{X}$ is a vector of control variables, IFL the indicator of financial integration, and u the error term.

I perform the analysis on an unbalanced panel dataset with annual observations for at most 70 countries, spanning from 1975 to 1999. Depending on the econometric methodology in use, I consider, in turn, the whole yearly panel, a cross-section of 69 countries with data averaged over the sample period, and a panel comprising up to 70 countries with non-overlapping five-year observations over the same period. The following subsections describe the main variables I include in the regressions: TFP, the stock of physical capital, the three measures of financial integration, the indicators of financial crises and the other control variables.

2.1 Capital accumulation

I retrieve the series of the physical capital stocks, K, applying the perpetual inventory method as in Hall and Jones (1999) on data from the Penn World Tables 6.1. I estimate the initial stock of capital, K_{t_0} as $\frac{I_{t_0}}{g+\delta}$, where g is the average geometric growth rate of total investments between t_0 and t_0+ 10.[6] In the paper t_0 is 1960, since I have data on investments dating back to that year for most countries.[7] A depreciation rate δ of 6 per cent is assumed. The following values of the capital stock are easily computed as $K_t =$

[6] Investments are defined as I = ki*rgdpch*pop from the PWT 6.1.

[7] In the countries which have no data for 1960 t_0 is the first year followed by at least 15 observations.

$(1-\delta)K_{t-1}+ I_t$.

2.2 Productivity

I construct the series of total factor productivity following the Hall and Jones (1999) approach to the decomposition of output. I assume the production function in country i to be

$$Y_i = K_i^{\alpha} (A_i H_i L_i)^{1-\alpha},$$

where Y_i is the output produced in country i, K_i is the stock of physical capital in use, A_i is labor-augmenting productivity, L_i is the labor in use (rgdpch* pop/ rgdpwok from the PWT 6.1), and H_i is a measure of the average human capital of workers ($H_i L_i$ is therefore human capital-augmented labor).[8] The factor share α is assumed constant across countries and equal to 1/3, which matches national account data for developed countries. I adopt the following specification for labor-augmenting human capital as a function of the years of schooling, s_i:

$$H_i = e^{\phi(s_i)}.$$

I rely on the results of Psacharopulos' (1994) survey and specify $\phi(s_i)$ as a piecewise linear function with coefficients 0.134 for the first four years of education, 0.101 for the next four years, and 0.068 for any value of $s_i > 8$.

Equipped with data on capital, output per worker, population and schooling (from Barro and Lee, 2001), I can compute the series of total factor productivity as

$$A_i = \frac{Y_i}{L_i} \frac{1}{H_i} \left(\frac{K_i}{Y_i} \right)^{-\frac{\alpha}{1-\alpha}}.$$

2.3 Financial integration

I use three different measures of financial integration. First, throughout all econometric specifications, I use a *de jure* dummy indicator of capital account liberalization, CAL, that takes value 0 if a country has held restrictions on capital account transactions by the residents during the year, and 1 otherwise. The existence of restrictions is classified on a 0-1 basis by the IMF in its Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), which is available for a maximum of 212 countries over the period 1967- 1996.[9] The major limit of this indicator is that it does not capture the

[8] In Hall and Jones (1999) Y_i is rgdpch*pop from the PWT, net of the value-added of the mining industry. Following Caselli (2005), I simplify and take rgdpch*pop.

[9] Classification methods have changed in 1996, so that there are now 13 separate indexes that can hardly be compared to the previous single indicator. Miniane (2000) harmonized the classifications, though for a

extent to which countries take advantage of the absence of restrictions by trading capital internationally. Despite this and the other limits summarized in Edison et al. (2002), *CAL* is the most commonly used indicator of international financial liberalization.

Second, for robustness, I also use the *de jure* index of capital account liberalization compiled by Quinn, that is available on a yearly basis for a small number of developed countries (18 in my sample), while it covers 142 countries (60 in my sample) with observations for 1958, 1973, 1982, 1988, and 1997. This indicator (*Quinn*), taking values between 0 (total restriction) and 100 (perfect capital account liberalization), is based on the information provided in the AREAER about restrictions on residents and non-residents, and takes into account the severity of restrictions across all categories of financial transactions. In order to maximize the overlap with the sample covered by the dummy indicator (*CAL*), I use *Quinn* only in 5-year panel and 25-year cross-sectional regressions.

Third, to estimate the effects of the actual participation of a country in international capital markets (*de facto* financial integration), I take as an indicator its gross external position as a ratio of GDP. This variable, *IFIGDP*= (Total Foreign Assets + Foreign Total Liabilities)/GDP, was built by Lane and Milesi-Ferretti (first release 2001, second 2007) using assets and liabilities data on FDI, equity portfolios, debt, derivatives and official reserves adjusted for valuation, and is available for 145 countries over the period 1970-2004 (67 countries between 1975 and 1999 in my sample). Note however that the debt component of this indicator includes sovereign debt (assets and liabilities), and countries' debts with official creditors such as the IMF, which abstract from the conventional definition of financial integration. It follows that even countries where capital account transactions are forbidden to private agents (classified as closed by any *de jure* index) may have gross foreign debt positions and be therefore considered *de facto* integrated with the international financial markets. This implies that the estimates for *IFIGDP* may confound the effects of sovereign foreign debt with those of liberalizing private cross-border transactions. This problem could be solved by subtracting sovereign foreign debt positions from *IFIGDP*, but data are not available at this level of disaggregation.

I overcome the limits of the *de jure* dummy and the *de facto* measure by regressing TFP and capital accumulation on *CAL*, *IFIGDP* and their interaction. The estimates for *CAL*IFIGDP* capture the effect of *de facto* integration in countries that do not impose restrictions on capital account transactions.

limited number of countries, and over a short time span.

2.4 Financial Crises

When accounting for financial crises, I distinguish between banking and currency crises. For banking crises (BC), I adopt the anecdotal indicator proposed by Caprio and Klingebiel (2003), who keep record of 117 systemic and 51 non-systemic crises occurring in 93 and 45 countries respectively, from the late 1970's and onwards. On a yearly base, the variable BC takes value 2 or 1 if the country has experienced a systemic or borderline banking crisis, respectively, and 0 otherwise. Caprio and Klingebiel label a crisis as systemic if a substantial proportion of banks' capital has been exhausted and borderline if the losses were less severe. To make this definition criterion clearer, I refer to a few episodes. The 1991 crisis in Sweden was systemic, since it involved insolvency or serious difficulties for 90 per cent of the banking system. The isolated failures of three UK banks between the eighties and the nineties, as well as the solvency problems of Credit Lyonnais in France in 1994-95, are instead labeled as borderline crises.

I rely on Glick and Hutchison (2000) for the chronology of currency crises (CC). They label as currency crises "large" variations (i.e. exceeding the sample mean plus twice the country-specific standard deviation) in an exchange rate pressure index, defined as a weighted average of monthly real exchange rate changes and monthly reserve losses. On a yearly base, the variable CC takes value 1 if the country has experienced such a "large" variation, 0 otherwise. This dummy is available for 90 countries between 1975 and 1997.

For robustness check, I also use the banking and currency crises dummy variables compiled by Bordo, Eichengreen, Klingebiel and Martinez-Peria (2001) for 56 countries between 1973 and 1997 (available for 21 of them since 1880).[10] An episode qualifies as a currency crisis ($CC\_BEKM\text{-}P = 1$) if either of the following occurs: (1) a forced change in parity, abandonment of a pegged exchange rate, or an international rescue; (2) the index of exchange market pressure exceeds a critical threshold.[11] The dummy for banking crises, $BC\_BEKM\text{-}P$, takes value 1 if a systemic banking crisis as defined in Caprio and Klingebiel (2003) occurs, 0 otherwise.

2.5 Other controls

Financial depth. I proxy it with the ratio of total credit to the private sector over GDP (*privo* from Beck and Demirguc-Kunt, 2001) and its growth rate. This variable gives a measure of the external finance available to firms. I control for *privo* in the equations for

[10] Eichengreen and Leblang (2003), among others, used these indicators.

[11] The exchange pressure index is calculated here as a weighted average of the percentage change in the exchange rate, the change in the short-term interest rate, and the percentage change in reserves, all relative to the same variables in the center country. The threshold is 1.5 standard deviations above the mean.

both investments and productivity to disentangle the direct effect of liberalization from the indirect one through financial depth.[12] I include the growth rate of *privo* in the linear probability models for financial crises, to account for the possibility that crises come along as by-products of sustained growth of the financial system (see Ranciere et al., 2007 and Tornell et al., 2003). Moreover, following Glick et al. (2006) among others, I control for financial development when analyzing the determinants of capital account liberalization.

Initial **real per capita GDP** (*rgdpch* from the PWT 6.1) accounts for different stages of economic development. It is often claimed that richer countries are more likely to have open financial markets, hence the effect of financial liberalization might seem spurious if initial GDP is not controlled for. If adding this variable to the regressions does not take away significance from the coefficient for financial liberalization, the suspects of spuriousness are less sound.

I include **government expenditure** as a ratio of GDP (*kg* from the PWT 6.1) in the regressions for capital accumulation. Several theories predict that government expenditure crowds out private investments. If this is the case, I should expect a negative coefficient in the equation for capital accumulation. I also use it as a covariate for the likelihood of both capital account liberalization and financial crises.

I control for **openness to trade**, proxied by import plus export as a ratio of GDP (*openk* from the PWT 6.1). Trade may affect the efficiency of an economy through several channels, such as specialization according to comparative advantage, access to larger markets with more product variety and increased competition. These effects may in turn stimulate both capital accumulation and productivity growth. Openness to trade is also included among the determinants of capital account liberalization and financial crises.

Intellectual property right protection is expected to enhance productivity by giving incentives for innovation. This is controlled for by using the measure (*ipr*) by Ginarte and Park (1997), which is available for five-year periods from 1960 to 1990.

I include a measure of **deposit insurance** (*depins* from Demirguc-Kunt and Sobaci, 2000) among the covariates for crises, since Demirguc-Kunt and Detragiache (1997) show that the existence of explicit deposit insurance increases the likelihood of bank runs and thus crises of the banking sector.

I also control for **inflation** (from the World Development Indicators) as a determinant of banking and currency crises crises. I take this variable as an indicator of bad macroeconomic policies, which are likely to make a country prone to crises.

[12] Klein and Olivei (1999) and Levine (2001) show that financial liberalization promotes financial development, which, according to Beck et al. (2000), may be expected to foster productivity more than capital accumulation.

It may be argued (see among others Glick et al, 2006) that countries with a larger current account exposition are more incline to change the degree of restrictions on capital account transactions. Hence, I include the **current account** as a share of GDP (from the IFS statistics) among the covariates for capital account liberalization.

It is claimed that governments may be more incline to remove restrictions on capital account transaction if the real interest rate paid on the international financial markets is low. Therefore, I also control for the US long term **real interest rate** (from the IFS statistics) as a determinant of capital account liberalization.

Finally, I use indicators of **economic and institutional development** to check for heterogeneity in the effects of financial liberalization and banking crises on both investments and productivity. In the cross-sectional estimates for TFP growth I explicitly control for institutional quality proxied by the Government Anti-Diversion Policy index ($GADP$, built as Hall and Jones, 1999 with annual data from the International Country Risk Guide). I also use it as a covariate for capital account liberalization. As an indicator of economic development, I construct a dummy ($LDC\prime s$) that takes value 1 if the country is defined as low or middle-low income in the World Development Indicators, and 0 otherwise. In the panel regressions, I use these indicators to construct interaction terms with the proxies of financial integration.[13]

3 The empirical analysis

This section explains the methodologies I follow to assess the effects of financial integration on capital accumulation and productivity, and reports the results. I first present the difference in difference approach applied to yearly panel data, then I turn to the long-run cross-sectional analysis using twenty-five year averages, to conclude with the dynamic panel regressions performed on non-overlapping five-year observations.

3.1 Panel difference in difference

I fully exploit the cross-sectional and time-series information in the annual dataset and estimate

$$P_{it} = \beta_0 + \boldsymbol{\beta}_1' \mathbf{X}_{it-1} + \gamma IFL_{it-1} + \eta_i + \nu_t + \varepsilon_{it}, \tag{2}$$

where P_{it} is a proxy for the outcome variable (either $\log(K)$ or $log(A)$ in the various specifications) observed in country i at year t, $\mathbf{X}$ are control variables including the indicators

[13] This gives equivalent results to interacting financial integration either with initial real per capita GDP, or with a dummy for countries with real per capita GDP below sample average. The results are available upon request.

of financial crises BC and CC and IFL is an indicator of financial liberalization. To alleviate the simultaneity bias, all regressors enter as lagged values. I start by considering the *de jure* dummy for capital account liberalization (CAL). η_i is a country-specific fixed effect capturing heterogeneity in the determinants of P that are specific to i, and its inclusion in (2) implies that γ is only estimated from the within-country variation around the liberalization date. Including the year fixed effects (ν_t) allows me to compare the change in P between the pre and post-reform periods in countries that have liberalized with the change in the countries that maintained the restrictions. This means that equation (2) is a "difference in difference" specification, since it implies differencing out the time-mean for each i, and the common trend for all i's at any t. Two main problems may undermine the ability of γ to identify a causal link from financial liberalization to the sources of growth.

First, there may be concerns about the selection of the countries that liberalized. Suppose that fewer episodes of liberalization were observed among countries that share a certain characteristic C, and that the countries with characteristic C experienced particularly low productivity. Then this trend in productivity, specific to countries with characteristic C, may bias the estimated effect of financial integration upwards. To tackle this issue, I first identify the most important factors that influence the decision to liberalize capital account transactions, by estimating the following probit on the annual panel dataset:

$$\Pr\left(CAL\_r_{it} = 1\right) = \Phi\left(\beta_o + \boldsymbol{\beta}_1 \mathbf{X}_{it}\right).$$

CAL_r_{it}, with $r \in \{in, out\}$ is an indicator of the reforms observed in country i at time t, and $\mathbf{X}_{it}$ is a set of covariates.[14] CAL_in equals 1 if a switch into capital account liberalization occurs, zero otherwise. CAL_out equals 1 if restrictions are put in place, zero otherwise. I also estimate a probit for the unconditional probability that restrictions are not in place, i.e. $\Pr\left(CAL = 1\right)$. The coefficient estimates in Table B represent the percentage changes in probability associated to an increase in the covariates. The z-statistics reported below each coefficient are derived from robust standard errors, clustered by country. Consistently with the evidence in Glick et al. (2006), countries with higher financial development are more likely to be financially open, while they are not more likely to adopt, nor to abandon, capital account liberalization. The probability of switching into liberalization is expectedly higher where institutions are better.[15] Interestingly, continent

[14] Following Glick et al. (2006), I include among the covariates the current account as a ratio of GDP, the US real interest rate, government expenditure, openness to trade, and a measure of institutional quality (gadp). I also control for the occurrence of banking and currency crises in the previous year and continental dummies.

[15] Current account over GDP has no significant effect across the specifications in Table B, meaning that large current deficits do not call for capital restrictions. However, if taken in absolute value current

dummies are among the best predictors of reforms. After finding a geographical pattern in the selection of liberalized countries, I check if there are systematic differences in productivity and investments across areas (Asia, Latin America, Africa, Europe + North America). Table C reports statistics on all measures of financial integration, TPF growth and capital accumulation across continents. Rows 1 and 2 contain, respectively, the numbers of reforms into and out of capital account liberalization, while row 3 indicates the number of country-years with $CAL= 1$. Note that Africa, accounting for more than one third of the sample, has the least number of capital account reforms and a very bad performance in terms of productivity growth. On the other hand, Europe and North America have the highest incidence of unreverted capital account liberalizations and the worst in capital accumulation. This suggests that the difference in difference estimates for γ might be affected by selection bias. To amend this bias, I control the regressions for continental trends in both productivity and capital.

A problem of endogeneity of policy changes may also arise. Suppose a country opens up when experiencing an economic crisis to help the recovery or alternatively when it is already on a sustained growth path. This may attribute a negative or positive effect to financial liberalization which is actually due to a trend, thereby producing biased estimates. As a solution to this problem, I control for a dummy taking value 1 during the three or five years prior to the liberalization and zero otherwise. Comparing the coefficient for this dummy with γ allows me to verify whether the change in P was part of a previous trend or followed liberalization. As a robustness check, I replace the dummy variable with a trend variable, taking values 1, 2 and 3, respectively three, two and one years before the reform. Moreover, I assess whether both reforms into and out of capital account liberalization (opening when a country is closed and closing when a country is open) promote economic performance, to test if countries systematically adopt the reform that fosters growth.

A concern about the consistency of difference in difference estimators may arise if the dependent variable is autocorrelated, as pointed out by Bertrand et al. (2004). In this case, the standard errors of the coefficient γ would be underestimated, thereby biasing the t-statistics towards over-rejection of the null $\gamma = 0$. Bertrand et al. (2004) propose several methods to get around this problem. I will follow their suggestion and estimate equation (2) without CAL, save the residuals only for the countries that experienced a reform, and regress them on CAL.[16] This is equivalent to identifying γ off the difference in the residuals before and after the reform.

account desplays positive and significant coefficients, suggesting that countries with a large current account exposure, irrespectively of its sign, are more incline to liberalize capital transactions.

[16] This procedure is referred to as "ignoring time series information" in Bertrand et al. (2004).

The evidence produced with difference in difference estimations is suggestive, since it gives a measure of the differential in economic performance explained by a clear-cut reform. As it is frequently pointed out in the literature though, the extent of financial integration cannot be fully captured by a zero-one indicator. There are many different restrictions that can be removed at different times, so that countries that are equally labeled as open by the AREAR dummy may actually enjoy different degrees of financial integration. Also, the extent to which an open country is active in the global capital market may vary over time. Using the *de facto* measures of financial integration described above allows me to take into account these concerns. Hence, I replicate most of the analysis considering the *de facto* measure $IFIGDP$ instead of CAL, and then both indicators jointly with their interaction.

3.1.1 Capital

Table 1a reports the results from the difference in difference regressions for the logarithm of physical capital stock, $\log(K)$, on yearly data. The specification in columns 1 and 2 only includes the *de jure* indicator of capital account liberalization (CAL), whose effects on investments are negative. These coefficients are robust to controlling for trends in capital up to three years prior to liberalization (CAL_switch3) and for time-continent effects, as reported in column 2.[17] Columns 3 and 4 show that banking crises (BC) and financial integration have a negative effect on capital accumulation, while currency crises seem to be irrelevant. Moreover, the estimates for the interactive terms $CAL*BC$ and $CAL*CC$ in column 4 suggest that financial crises do not have different effects across closed and open countries. The interaction analysis in columns 5 and 6 shows that capital account liberalization restrained capital accumulation less in developing countries, as well as in Latin America and Africa (where it was even beneficial). Column 7 does not support the hypothesis that financial integration has different effects across the first and the second half of the sample period (pre and post 1985). When I control for real per capita GDP, government expenditure and credit to the private sector as a ratio of GDP (column 8), the results for CAL, and CC remain unchanged, while BC becomes positive and significant. The coefficients in column 8 also show that countries with higher per capita GDP and government expenditure accumulate more capital, while financial depth (as proxied by *privo*) is uninfluential. The results are robust to the inclusion of openness to trade, whose coefficient always turns out to be insignificant and is thus omitted.

To check the robustness of these results to changes in the indicators of financial integra-

[17] The results do not change if I use CAL_switch5, which equals 1 for the five years prior to the reform.

tion and crises, I replicate some of the estimations of Table 1a replacing the *de jure* index CAL with the *de facto* measure $IFGDP$, and substituting BC and CC (from Caprio and Klingebiel, 2003 and Glick and Hutchison, 2000, CK-GH henceforth) with $BC\_BEKM\text{-}P$ and $CC\_BEKM\text{-}P$ (from Bordo et al., 2001). The results are reported in Table 2a. In column 1, I regress capital on *de facto* financial integration and crises from CK-GH. While banking crises lose significance, the gross external position has a negative impact on capital. As mentioned above, the estimates for *IFIGDP* may deliver a distorted picture of the link between financial globalization and economic outcomes, especially if countries that are *de jure* closed have large sovereign debt positions (such as most of the African countries in Table C). To account for this potential distortion, in column 2 I control also for *de jure* liberalization CAL and its interaction with the *de facto* measure. The coefficients for *IFIGDP* and *IFIGDP*CAL* suggest that countries with large gross external positions suffered a drop in physical capital if *de jure* closed, while they were not affected if *de jure* open. This result is consistent with the coefficients reported in column 3 for the interactions of *IFGDP* with continental dummies. The only countries that suffered from external financial exposition were the African ones, that were mostly *de jure* closed as shown in Table C. The interaction with the LDC's in column 4 does not display a significant heterogeneity in the effect of financial liberalization. In columns 5-7, I consider the alternative set of financial crises indicators proposed by Bordo et al. (2001). In so doing, I loose observations for 13 countries, but add two years to the time series. The picture does not change significantly: both *de jure* and *de facto* indicators have a negative coefficient if considered separately (columns 5 and 6), while the effect of gross external positions on capital is nil in *de jure* open and negative in *de jure* closed countries (as from column 7). Neither banking nor currency crises have a significant link with capital stock.

Table 3a reports robustness checks on the difference in differences estimates with the maximum number of controls, reported in column 8 of Table 1a. The first two columns refer to the correction proposed by Bertrand et al. (2004). In column 1, I report the results from regressing the physical capital stock on all control variables but CAL, and controlling for country and time fixed effects. As in column 8 of Table 1a, the coefficients for banking crises, real per capita GDP and government expenditure are positive and significant, while those for currency crises and financial depth are nil. I saved the residuals from the estimation in column 1 only for the countries that experienced a regime shift in capital account restrictions, and regressed them on CAL. The coefficient and its standard error in column 2 confirm that financial integration reduces significantly capital by more than 8 per cent. In columns 3 and 4 I try to identify the effect of a policy switch out of financial openness. In column 3, I restrict the attention to those countries that were

not closed all the time, and regress capital stock on the usual controls plus an indicator that takes value one if there is not financial openness and zero otherwise. In this way, the coefficient compares the change in capital stock before and after the adoption of restrictions in the countries that closed their financial markets with the change in K in the countries that remained open. The effect is positive and significant. In column 4, I take the full sample and regress K on an indicator that equals 0 if a country is open in a given year or if it is closed throughout the entire sample, and 1 otherwise. The positive and significant coefficient for CAL_off suggests that capital rose in countries that closed their financial markets compared to the countries that were open or remained closed ever. These results prove that regime switches out of financial liberalization have the opposite effect of switches into it. In columns 5-7, I control in alternative ways for the pre-reform trends in physical capital. In column 5, I decompose the dummy CAL_switch in two dummies for switches on and off liberalization. In column 6, these dummies are no longer step dummies, but take the form of a three-period linear trend in the three years prior to reforms. In both cases their introduction does not affect the significance of the coefficient for financial openness. In column 7 I add a pre-reform trend for each country that has liberalized. This helps me account for other reforms that countries may have adopted just before capital account liberalization. Also in this case, no significant change occurs with respect to the other regressions.

Overall, countries that removed the restrictions on capital account transactions experienced up to a 14 per cent drop in physical capital compared to those that did not. Countries that doubled their gross external position over GDP (IFIGDP) had a 6 to 16 per cent drop if they kept capital restrictions, while they were not affected if they removed them. The occurrence of a banking and currency crisis may reduce capital, raise it or even leave it unaltered: the results are not robust across different samples.

3.1.2 Productivity

Tables 1b, 2b and 3b report the results from the difference in difference regressions for *TFP* levels, $\log(A)$, on yearly data. The coefficients for *de jure* liberalization (CAL) reported in Table 2a are positive and significant across all specifications in columns 1-8. Banking crises have a negative and significant effect on TFP under all specifications, while the negative coefficient for currency crises is significant (at ten per cent confidence level) only in columns 3 and 5. As in the regressions for capital, the interactions between *de jure* liberalization and financial crises of column 4 show that the effects of banking and currency crises do not differ across open and closed countries. The interactions with continental dummies in column 5 suggest that the impact of capital account liberalization

is positive all over, though stronger in African countries. The statistically zero coefficients for *CAL*LDC's* and *CAL post '85* in columns 6 and 7 exclude different effects of financial integration on productivity between developed and developing countries, as well as across the first and the second half of the sample period. Column 8 shows that intellectual property right protection, as expected, raises TFP, and that richer countries tend to have higher productivity. Despite the inclusion of real per capita GDP, the coefficient for *CAL* remains positive and significant, which does not lend support to the argument that open countries perform better in terms of TFP simply because they are also richer. Notice that the estimate for *privo* is not significantly different from zero, suggesting that financial depth may not be an effective indirect channel linking liberalization and productivity.

In Table 2b, I replicate for productivity the exercise reported for capital in Table 2a. Controlling for the CK-GH set of financial crises, I do the following: regress TFP on *IFIGDP* (column 1); add to this specification *CAL* and its interaction with the *de facto* measure (column 2); interact *IFIGDP* with dummies for Africa and Latin America (column 3) and LDC's (column 4). Controlling for the BEKM-P set of financial crises, I regress TFP on *CAL* (column 5), replace *CAL* with *IFIGDP* (column 6) and add *CAL* plus its interaction with *IFIGDP* (column 7). As in Table 1b, banking crises have a negative coefficient throughout all specifications, while the estimates for currency crises are significant only when Bordo et al (2000) indicators are used (columns 5-7). At first, the estimates for *de facto* financial integration alone, in column 1, would suggest that larger external capital positions hinder productivity. The coefficients in column 2 however tell that *de facto* integration does spur TFP when accompanied by *de jure* liberalization. Large gross external positions in presence of *de jure* restrictions may be arguably composed by sovereign foreign debt and loans from official creditors (e.g. the IMF). In line with this argument, column 3 shows that an increase in gross external positions reduced productivity in African and Latin American countries (hinging greatly on foreign sovereign debt and official loans), while it spurred TFP in the rest of the world. The interaction with the dummy for LDC's in column 4 suggests that financial integration was productivity enhancing in the developed countries, not in the developing ones. The robustness analysis with financial crises indicators from Bordo et al. (2001), in columns 5-7 confirms the previous results. Notice that 13 countries, mainly African and Latin American, are dropped from the sample when changing crises indicators. Their exclusion explains the loss of significance for the *de facto* measure alone in column 6.

Table 3b reports robustness checks on the difference in differences estimates of column 8 in Table 1b. The first two columns refer to the correction proposed by Bertrand et al. (2004). In column 1, I report the results from regressing TFP on all control variables but

CAL, country and time fixed effects. Column 2 shows the coefficient estimated regressing on CAL the residuals from the specification in column 1 only for the countries that experienced a reform to capital account restrictions. Banking crises and per capita GDP maintain the coefficients of column 8 in Table 1b, and financial integration is shown to raise significantly productivity by almost 8 per cent. In columns 3 and 4 I try to identify the effect of a policy switch out of financial openness as in columns 3 and 4 of Table 3a. The coefficient for CAL_off in column 3, suggests that TFP dropped after the adoption of restrictions in the countries that closed their financial markets relative to the countries that remained open. In column 4, I take the full sample and regress TFP on an indicator that equals 0 if a country is open in a given year or if it is closed throughout the entire sample, and 1 otherwise. The negative and significant coefficient for CAL_off suggests that productivity dropped in countries that closed their financial markets compared to the countries that were open or remained closed ever. These results prove that regime switches out of financial liberalization have not the same, positive effect of switches into it. In columns 5-7, I control in alternative ways for the pre-reform trends in TFP. In column 5, I decompose the pre-reform trnd dummy CAL_switch into two dummies for switches on and off liberalization. In column 6, these dummies are no longer step dummies, but take the form of a three-period linear trend in the three years prior to reforms. In both cases their introduction does not affect the significance of the coefficient for financial openness. Column 7 reports the result from adding a pre-reform trend for each country that has liberalized. Again, no significant changes occur with respect to the other regressions.

Overall, countries that removed the restrictions on residents' capital account transactions experienced a 5 to 8 per cent rise in TFP compared to those that did not. Countries that doubled their gross external position over GDP (IFIGDP) had a 1 per cent increase in productivity if they did not lift capital restrictions, while they enjoyed a 10 per cent rise if they did so. The occurrence of a banking and crisis reduces TFP by 3 to 5 per cent, while currency crises may be accompanied by a 2-3 per cent drop, which is significant only for the BEKM-P indicator.

3.2 Cross-sectional analysis

To study the effects of financial openness on TFP and capital in the long run, I estimate the following growth regressions:

$$dp_{i(t-25,t)} = \beta_0 + \lambda p_{it-25} + \boldsymbol{\beta}_1' \mathbf{X}_{i(t-25,t)} + \gamma IFL_{i(t-25,t)} + u_{it}, \tag{3}$$

where $dp_{i(t-25,t)} = 100\frac{\log(P_{it})-\log(P_{it-25})}{25}$ with $p = \log(P)$, $P \in \{A, K\}$, and the regressors indexed by $(t-25,\ t)$ are 25-year period averages. A coefficient estimate $\hat{\lambda} < 0$ indicates that there is conditional convergence. The speed of convergence b can be obtained from $\lambda = -100\frac{1-e^{b25}}{25}$. As for the difference in difference regressions presented above, I start by considering $IFL = CAL$, and then replicate the analysis for the other measures of financial integration, $IFL = Quinn$ and $IFL = IFIGDP$.

Tables 4a and 5a report the results for capital accumulation. The coefficients for the capital stock at the beginning of the period (*k_25*) are always negative and significant, suggesting that, other things equal, countries starting with a lower endowment experience a faster growth of physical capital. Contrary to the difference in difference analysis, the estimates for financial depth are positive and significant. All other control variables in Table 4a, including the CK-GH indicators of financial crises, are irrelevant to explain investments in the long run. Only the coefficient for capital account liberalization in Latin American is significant, and negative. In columns 1-7 of Table 5a, controlling the regressions of capital growth for the CK-GH indicators of financial crises, I do the following: replace the *de jure* dummy of capital account liberalization with the *de facto* measure *IFIGDP* (column 1); include in the specification both indicators and their interaction (column 2); interact *IFIGDP* with dummies for continents (column 3) and LDC's (column 4); use Quinn's *de jure* index (column 5); interact it with continent (column 6) and LDC's dummies (column 7). Higher gross external positions spur capital accumulation in *de jure* open countries, hinder it where residents cannot access international financial markets. Consistently with this result, investments grow with the exposition to foreign capital markets in all countries but the African and Latin American ones. The effect of *de jure* liberalization is nil if proxied by Quinn's index. In columns 8-11, I control for the BEKM-P set of financial crises indicators and for: the IMF *de jure* capital account liberalization index; the *de facto* measure of financial integration; both indicators and their interaction; and Quinn's index. No significant link between financial globalization and investments emerges from these estimates.

Tables 4b and 5b report the results for TFP growth rate. The coefficients for the initial level of TFP do not support robustly the hypothesis of conditional convergence in productivity. The effects of banking and currency crises on TFP growth are negative but only occasionally significant. In Table 4b, the IMF *de jure* proxy for capital account liberalization has a positive and significant coefficient under the basic specification in column 1, controlling only for banking and currency crises. The same holds in columns 4 and 5, where I also interact CAL with dummies for Africa and Latin America, and LDC's. As in the difference in difference annual estimations, *de jure* liberalization does

not spur productivity in developing countries, and mainly in the Latin American ones, while it is definitely beneficial in the others. The interactions in column 3 show capital account liberalization to have the same effect across countries that experienced banking or currency crises and those that did not. Financial depth, in columns 6 and 7, has a positive effect on long run productivity growth. In Table 5b, I replicate for TFP growth the exercise done in Table 5a for investments. The results in columns 1-4 are consistent with the difference in difference estimates on annual data. *De facto* financial integration spurs productivity where it is accompanied by *de jure* liberalization. It is also beneficial in countries outside Africa and Latin America, and mainly in the developed ones. This evidence is consistent with the hypothesis that increases in *IFIGDP* that are not due to changes in sovereign foreign debt or loans from international organizations raise TFP. The positive and significant coefficients for Quinn's *de jure* index in columns 5 and 6 provide robustness to the evidence for CAL of Table 4b. Column 8 replicates the estimation of column 1 using the BEKM-P set of banking and currency crises, and thereby dropping 11 African and Latin American countries from the sample. Consistently with the evidence of column 4, the coefficient for IFIGDP alone is now positive and significant.

In sum, the long-run analysis provides some evidence that financial integration spurs productivity growth, mainly in the developed countries, while it has no significant impact on capital accumulation. As emphasized by the empirical growth literature, cross-sectional estimates have several limits. They do not allow me to exploit the time-series variation in the data on financial integration, which is particularly important when assessing the effects of reforms; and cannot control for omitted variables, country-specific effects and endogeneity of the regressors. In this case, addressing endogeneity with an instrumental variable strategy is rather difficult. Legal origins may be a good instrument for financial development (see La Porta et al, 1997), but do not seem particularly suitable to instrument a variable as CAL, which involves policy changes and perhaps reversals over the sample. The same argument applies to continental dummies, that stand in Table B among the best predictors of capital account liberalization. Other good predictors, such as the quality of institutions and financial development are known to be an important determinant of TFP (see, among others, Hall and Jones, 1999) and investments, and hence do not seem valid instruments for CAL nor for the other indicators of IFL.

3.3 Dynamic panel analysis

To exploit the time variation in the proxies of *IFL*, I could estimate equation (3) on a panel dataset, assuming $u_{it} = \eta_i + \nu_t + \varepsilon_{it}$, but this would generate consistency problems. As the right-hand side of equation (3) includes the lagged dependent variable ($p_{t-\tau}$),

even if ε_{it} is not correlated with $p_{t-\tau}$, the estimates are not consistent, given the finite time span. Moreover, consistency may be undermined by the endogeneity of other explanatory variables, as in the cross-sectional estimates. To correct for the bias created by lagged endogenous variables, and the simultaneity of some regressors, I follow the approach proposed by Arellano and Bover (1995) and Blundell and Bond (1998). I estimate the following system with GMM

$$dp_{it} = \beta_0 + \theta dp_{it-5} + \boldsymbol{\beta}_1' d\mathbf{X}_{it} + \gamma dIFL_{it} + d\nu_t + d\varepsilon_{it} \quad (4)$$

$$p_{it} = \beta_0 + \theta p_{it-5} + \boldsymbol{\beta}_1' \mathbf{X}_{i(t-5,t)} + \gamma IFL_{i(t-5,t)} + \eta_i + \nu_t + \varepsilon_{it}, \quad (5)$$

where dp_{it} equals $\log(\frac{P_{it}}{P_{it-5}})$ with $P \in \{K, A\}$, and the other regressors are the same as in the previous equations. Variables indexed by $(t-5, t)$ are averages over the period between *t-5* and *t*. η_i, ν_t and ε_{it} are the unobservable country- and time-specific effects, and the error term, respectively. The presence of country effect in equation (5) corrects the omitted variable bias. The differences in equation (4) and the instrumental variables estimation of the system are aimed at amending inconsistency problems. I instrument differences of the endogenous and predetermined variables with lagged levels in equation (4) and levels with differenced variables in equation (5). For instance, I take p_{it-15} as an instrument for dp_{it-5} and IFL_{it-10} for $dIFL_{it}$ in (4) and dp_{it-10} as an instrument for p_{it-5} and $dIFL_{it-5}$ for IFL_{it} in (5). I estimate the system by two-step Generalized Method of Moments with moment conditions $E[dp_{it-5s}\ (\varepsilon_{it} - \varepsilon_{it-5})] = 0$ for $s \geq 2$, and $E[dz_{it-5s}\ (\varepsilon_{it} - \varepsilon_{it-5})] = 0$ for $s \geq 2$ on the predetermined variables z, for equation (4); $E[dp_{i,t-5s}\ (\eta_i + \varepsilon_{i,t})] = 0$ and $E[dz_{i,t-5s}\ (\eta_i + \varepsilon_{i,t})] = 0$ for $s = 1$ for equation (5). I treat all regressors as predetermined. The validity of the instruments is guaranteed under the hypothesis that the residuals from (4) are not second order serially correlated. Coefficient estimates are consistent and efficient if both the moment conditions and the no-serial correlation are satisfied. To validate the estimated model, I apply a Sargan test of overidentifying restrictions, and a test of second-order serial correlation of the residuals.[18] As pointed out by Arellano and Bond (1991), the estimates from the first step are more efficient, while the test statistics from the second step are more robust. Therefore, I will report coefficients and statistics from the first and second step respectively. Note that in this case the speed of convergence b obtains from $\theta = e^{5b}$.

Tables 6a and 7a report the dynamic panel regressions for capital (p=log*(K)*). The estimates for *k_ 5* in both tables confirm the prediction of the neoclassical growth model,

[18] Including too many lags among the instruments can cause the power of the Sargan test to collapse, potentially hiding the invalidity of instruments (see for example Bowsher, 2002). To avoid this problem, I restrict the number of lags to t-10 and t-15.

that capital accumulation slows down as capital grows up towards its steady state value, and also that there is conditional convergence across countries. In Table 6a, the coefficients for *de jure* capital account liberalization (CAL) are not significantly different from zero, in line with the ones reported in Table 4a. Banking crises (BC) depress investments, while the results for currency crises (CC) are not robust. Table 7a rejects the hypothesis that financial integration, proxied by any of the three indicators in use, has an impact on capital accumulation, with the exception of Latin America, where it may lower investments.

The estimates for TFP are reported in Tables 6b and 7b. Both tables support robustly the existence of conditional convergence in productivity, with an implied speed of convergence of about 5-6 per cent per year. Under all specifications in Table 6b, capital account liberalization (CAL) is shown to spur productivity growth, and banking crises are proven harmful for it, while currency crises are irrelevant. Trade does not seem to have a significant effect on TFP growth, nor does financial depth, as reported in column 6 of Table 6b. The interactions $CAL*BC$ and $CAL*CC$ in column 4 suggest that the negative effects of financial crises were more severe in open countries. Columns 6 and 7 prove financial liberalization to be overall beneficial for productivity, though to a lesser extent in the developing countries (column 7) and especially the Latin American ones (column 6).[19] The regressions in Table 7b show the positive impact of financial liberalization on TFP to be robust to the adoption of any of the three *de jure* and *de facto* measures of integration, and the two sets of financial crises indicators. As in the previous difference in difference and cross-sectional analyses, the positive effect of financial globalization is stronger where gross external positions are accompanied by *de jure* liberalization, and weaker in countries that rely more heavily on foreign sovereign debt and loans from international organizations, such as the developing countries, mainly the African and Latin American ones.

Quantitatively, over a five-year period, a country that liberalizes according to the AREAER outperforms a closed one in TFP by 12 to 19 per cent (by 1 per cent if LDC, 26 if developed country). This leads to a long-run difference in TFP of about 60 per cent (coefficient 0.609, standard error 0.299), which is consistent with the results from the cross-section. Similarly, TFP grows 14 per cent more in a country scoring a Quinn's index of capital account liberalization twice as another. Moreover, doubling *de facto* integration (IFIGDP) implies raising productivity by more than 2 per cent in five years (7.5 per cent

[19] The total difference in productivity (growth) between a developed country that was open and one that was closed during the whole 5-year period would be about 26 per cent. The difference would be just 1 per cent in the case of developing countries. Similarly, an open Latin American country would enjoy a less than 3 per cent higher TFP (growth) than a closed one, while an open country in the rest of the world would outperform by 19 per cent.

if the country is also *de jure* open). Whatever measure of financial openness is adopted, capital grows along the same path in both closed and open countries.

The results above suggest that, over a one to five-year period, financial liberalization has a robust positive direct effect on TFP, while it hardly affects capital accumulation, and if so it does it in a negative way. Given that the two main sources of GDP growth are not affected to the same extent by financial globalization, it seems reasonable that the literature has struggled to establish a significant and robust empirical relationship between financial integration and GDP growth. To corroborate this claim, I report in Table 8 the results from estimating the system (4)-(5) for real aggregate GDP, using the three measures of financial liberalization. Consistently with many papers in the literature, the IMF *de jure* indicator obtains statistically zero coefficients, while the estimates for Quinn's gradual *de jure* index and the *de facto* measure are positive. Nevertheless, having shown that TFP benefits from financial integration, the non robust evidence for GDP growth should no longer be a concern, since the literature on growth accounting tells us that what really matters in the long run is productivity.

4 The indirect channels

In this section I explore more in depth two indirect channels through which financial globalization may affect productivity and investments: banking and currency crises and financial development.

4.1 Financial integration and financial crises

The analysis in the last section suggests that banking and currency crises may be detrimental for both capital accumulation and TFP. It is often argued that financial instability may be triggered by the exposure to international financial markets. In this subsection, I investigate if, and to what extent, the negative effects of financial crises should ultimately be imputed to financial liberalization. To do so, I estimate on the annual panel dataset the following probit for the probability of a banking and currency crises:

$$\Pr\left(Crisis\_type_{it}=1\right)=\Phi\left(\beta_o+\boldsymbol{\beta}_1\mathbf{X}_{it}+\gamma IFL_{it}\right).$$

The variable $Crisis\_type_{it}$ takes value one if a crisis of a given *type* (systemic, borderline, any banking crisis, or currency crisis) has occurred in country i at time t, zero otherwise. The vector $\mathbf{X}_{it}$ includes a series of covariates, and IFL_{it} is a proxy of international financial liberalization. The coefficient estimates represent the percentage changes in the probability of a crisis associated to an increase in the covariates. The z-statistics reported below each

coefficient are derived from robust standard errors, clustered by country.

Table 9a reports the results for the probability of financial crises as a function of the *de jure* dummy for capital account liberalization (CAL) and a series of covariates. The coefficient estimates for CAL on the full sample (Panel A) are not significantly different from zero, with the exception of minor (borderline) banking crises, that are 1.7 per cent more likely in liberalized countries. This evidence is in line with the recent findings in Glick et al. (2006) and Ranciere et al. (2006). High inflation is generally responsible for a higher likelihood of banking crises. High real GDP per capita and growth rate of financial depth significantly reduce the probability of crises. The first result is in line with the predictions in Martin and Rey (2006), while the second seems to contradict the "bumpy path" hypothesis proposed by Ranciere et al. (2007) and Tornell et al. (2003). Splitting the sample between developed and developing countries (panels B and C), I find that CAL increases the likelihood of (borderline) banking and currency crises in developed countries, while it has no effect in the developing ones. Higher per capita income is associated to a lower likelihood of banking and currency crises, while inflation raises the probability of banking crises, regardless of the degree of development of a country. Faster growth of financial depth reduces the likelihood of crises only in the LDC's.

I replicate the estimations of Table 9a using the other indicators of financial integration, whose coefficients I report in Table 9b.[20] Capital account liberalization, as indexed by Quinn, raises the probability of minor banking crises in all countries. The coefficients in the first row of Table 9b suggest that a country switching from half to totally open ($Quinn$=50 to 100) has a 22 per cent higher probability of suffering a minor banking crisis. Its likelihood of experiencing a severe banking or a currency crisis remains unchanged. The second row of Table 9b tells that the probability of a (systemic) banking crisis rises by 11 per cent in a developed country experiencing an increase in total foreign assets + liabilities equal to its GDP (equivalent to a more than 80 per cent rise of $IFIGDP$ in the average European or North American country). The same change in foreign wealth would imply a 7 per cent drop in the likelihood that a developing country suffers a currency crisis (this would require the average African country to roughly double $IFIGDP$).

As argued in Eichengreen and Leblang (2003), the onset of a financial crises may follow capital account liberalization with some lag. If this were the case, the evidence in Tables 9a and 9b would not be capturing it, since it relies on one-year lags. To account for delayed effects of financial liberalization, I replicate the probit estimations on the 5-year

[20] For parsimony, only the coefficents for the proxies of IFL are reported. The estimates for the other covariates (deposit insurance, real per capita GDP, inflation, trade/gdp and the growth rate of privo) are available from the author.

averages of the IFL indicators and report the results in Table 9c. CAL only raises the probability of minor banking crises in developed countries, *Quinn* does the same, but also in the developing countries, *IFIGDP* keeps increasing the likelihood of systemic crises in developed countries, while reducing the risk of currency crises in the LDC's.

Overall, accounting for the negative impact of financial crises on TFP and investments, and the generally small increase in the likelihood of crises that financial integration generates, its net effect remains positive for productivity, and nil to negative for capital accumulation.

4.2 Financial integration and financial development

The previous section suggests that financial depth does not affect productivity and investments in a robust way, once the *de jure* dummy index of capital account liberalization (CAL) is accounted for. Since this result looks at odds with the evidence in Beck et al. (2000), it is worth expanding the analysis of the effects of financial development controlling also for the other indicators of integration (*IFIGDP* and *Quinn*). Table 10a reports the results of difference in difference and DPD regressions of capital (Panel A) and TFP (Panel B) on financial crises, *privo* and alternative indicators of financial integration. Financial depth affects positively capital accumulation throughout most specifications, while its positive impact on productivity is significant only in half of the equations. In any case, controlling for financial development does not alter the coefficients for liberalization in a relevant way, compared to the results in Tables 2a-2b and 7a-7b. This does not exclude that financial depth be a channel through with financial integration affects productivity, though it suggests that the indirect link may be weak.

To investigate if, and to what extent, the effects of *privo* on capital accumulation and productivity are due to financial globalization, I regress private credit over GDP on the IFL indicators and other control variables. The results in Table 10b do not provide robust support to the existence of a link between financial liberalization and *privo*. Together with the evidence on the nexus between financial development, productivity and investments, this implies that financial depth serves as a weak indirect channel between financial globalization and the sources of growth.

5 Discussion

The evidence in section 3 suggests that financial integration is accompanied by an increase in productivity. This effect seems at odds with the theoretical predictions that financial liberalization would foster capital accumulation, and eventually raise TFP by relieving

the economies from credit constraints.

A plausible way to rationalize this result is to draw a parallel between financial integration and trade openness. In particular, one can interpret financial openness as integration in the market for financial services. In a world with market imperfections, financial services (such as screening, monitoring, debt structuring, etc.) can be seen as an important factor of production for firms that need to raise external capital. Since the quality and varieties of financial services are likely to differ across countries and sectors, financial liberalization may generate the typical gains from trade. Specialization allows firms in all countries to buy any given financial service at the best price. Moreover, the access to new varieties of services may provide firms with the most appropriate financial instruments, which spurs productivity. This rise in TFP would be due to an increase in allocative efficiency, which is empirically documented by Galindo et al. (2005). As another consequence of financial liberalization and specialization in financial services, one should observe financial intermediaries enter foreign markets following comparative advantage patterns, as recent evidence from microdata shows. For instance, the results in Focarelli and Pozzolo (2000) suggest that foreign banks enter more often in countries where banks are less efficient, and Clarke et al. (1999) show that they tend to serve the sectors in which they have more expertise. Moreover, Claessens et al. (2001) document an overall efficiency gain in the financial intermediation sector.

To the extent that better financial services reduce the volatility in output (for instance through effective selection or monitoring of the borrowers), financial integration may reduce the volatility of aggregate production of a country. On the contrary, in the models that see financial globalization mainly as an international portfolio diversification device (e.g. Obstfeld, 1994), financial integration tends to promote risk taking at the country level, which raises output volatility. Table 11 reports results from OLS regressions of the 1975-1999 sample standard deviation of the growth rate of real GDP on the indicators of financial integration and financial crises. The negative and significant coefficients of IFL seem inconsistent with the prediction of financial globalization raising output volatility. The same holds for TFP in columns 5-8.

Financial integration may also generate frictional unemployment due to the reallocation of capital from less to more efficient firms, as a consequence of the improvement in the financial services of screening and selection of borrowers. Looking at data on labor and employment may be an interesting extension of the analysis in the present paper.

6 Conclusions

A wide literature has focused on the effect of financial liberalization on GDP growth, often finding mixed results. To better understand the effect of financial liberalization, however, it is important to know the channels through which it operates. This paper has attempted to probe deeper into the relationship by separately studying the impact of financial openness on two sources of income growth: capital accumulation and productivity. Contrary to the existing literature, I find fairly robust results, using both *de facto* and *de jure* indicators of financial integration. In particular, financial liberalization has a positive direct effect on productivity, while it has virtually none on capital accumulation.

In my analysis I took into account two possible indirect channels through which financial globalization may affect economic performance: financial development and financial crises. The most interesting result applies to the latter factor. As expected, banking and (to a minor extent) currency crises have a strong negative impact on economic performance, though the likelihood that they occur does not rise much under financial integration. In fact, globalization raises only the probability of minor banking crises in developed countries. Nevertheless, the positive direct effect of financial liberalization on TFP survives.

Finally, the paper briefly discusses a possible explanation for the positive direct effect of financial integration on productivity. The idea is that removing restrictions to international financial transaction opens the door to trade in financial services, which can be considered as a production factor. As in trade models, openness generates gains from specialization and widening of varieties, which raise efficiency in the allocation of capital in each and every country, thereby fostering TFP growth. This mechanism is supported by some existing evidence on the pattern of internationalization of financial intermediaries, and on the allocative efficiency of investments. Developing a theoretical foundation of comparative advantage and differentiation in financial services, and testing it seem interesting directions for future research.

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Table A
Countries, samples and financial liberalization dates

Country	CAL_on	CAL_off	Country	CAL_on	CAL_off
Argentina	1967-1993	1970	Madagascar	1967	1968
Austria	1991		Malaysia	1973	
Bangladesh			Mali		
Bolivia	1986	1981	Mauritius		
Botswana			Mexico		1982
Brasil			Morocco		
Burundi			Mozambique		
Cameroon	1967	1968	Nepal		
Canada			Netherlands		
Chile			New Zealand	1984	
Colombia			Nicaragua		1978
Costa Rica	1980-1995	1974-1982	Nigeria		
Denmark	1988		Norway	1995	
Ecuador	1971-1988-1995	1970-1986-1993	Panama		
Egypt			Paraguay	1982	1984
El Salvador			Peru	1978-1993	1970-1984
Equatorial Guinea			Philippines		1969
Ethiopia			Portugal	1993	
Finland	1991		Sierra Leone		
France	1990	1968	Singapore	1978	
Germany			South Africa		
Ghana			Spain	1994	
Greece			Sri Lanka		
Guatemala	1973-1989	1980	Sweden	1993	
Guinea Bissau			Switzerland		
Hong Kong			Thailand		
Iceland			Trinidad and Tobago	1994	
India			Tunisia		
Indonesia	1969		Turkey		
Italy	1990		Uganda		
Jamaica			United Kingdom	1979	
Japan	1979	1995	Uruguay	1978	1968-1993
Jordan			Venezuela		1984
Kenia			Zambia		
Korea			Zimbabwe		

Note. CAL_on and CAL_off report the dates of removal and adoption, respectively, of restrictions on capital account transactions. (source: IMF). All countries enter panel estimations, Mauritius is not included in the cross-section.

Table B

Capital account liberalization - yearly panel - dprobit

	CAL	CAL_in	CAL_out	CAL	CAL_in	CAL_out	CAL	CAL_in
Current Account	-0.017	0.001	-0.001	-0.019	0.001	-0.001 **	-0.022 **	0.001
	-1.590	0.720	-0.610	-1.560	1.130	-2.140	-2.280	1.190
US real interest	-0.006	0.000	0.001	-0.033 ***	-0.003	0.001	-0.035 ***	-0.002
	-1.160	-0.180	0.500	-2.590	-1.590	1.230	-3.120	-1.610
Government (lgov)	0.024	0.000	-0.001	0.120	0.004	-0.002	0.142	0.002
	0.310	0.030	-0.200	1.510	0.660	-0.710	2.110	0.480
Trade (lopen)	-0.043	0.015 ***	0.006	-0.086	0.010	0.004	-0.113 *	0.005
	-0.550	2.650	1.380	-0.910	1.580	0.910	-1.720	0.920
Private Credit (lprivo)	0.216 ***	0.006	-0.001	0.217 ***	-0.004	0.003	0.131 **	-0.004 **
	3.960	1.480	-0.650	3.210	-1.010	1.000	2.240	-0.850
GADP				0.039	0.008 *	-0.003 *	0.036	0.007 *
				0.760	1.880	-1.870	0.750	1.660
Banking Crisis (BC)	-0.003	-0.012 *	0.004	-0.031	-0.014 **	0.002	-0.016	-0.011 **
	-0.080	-1.860	1.140	-0.870	-2.100	0.620	-0.560	-2.040
Currency Crisis (CC)	-0.044	-0.009	-0.002	-0.004	-0.006	0.002	0.042	-0.001
	-1.110	-0.870	-0.310	-0.070	-0.530	0.300	0.910	-0.130
Asia							0.668 ***	0.006
							3.390	0.360
Latin America							0.583 ***	0.041 ***
							3.810	2.440
Europe & N. America							0.635 ***	0.027
							2.780	1.040
Pseudo R2	0.171	0.058	0.044	0.242	0.105	0.115	0.381	0.152
Observations	965	962	962	612	611	611	612	611

Note. CAL, CAL_in and CAL_out indicate capital account liberalization, and the switches into and out of it, respectively. The coefficients in theese columns are estimated with probit and represent the increase in the probability of capital account liberalization (and its swicthes) associated with a per cent change in the covariates. Asia, Latin America and Europe & N. America are continental dummies. All covariates enter as lagged values. A constant is included in all regressions. The robust standard errors are clustered by country. *, ** and *** indicate that a coefficiant is significant at 10, 5 and 1 per cent level, respectively.

Table C
Financial integration, crises and economic performance across continents

	Asia	Africa	Latin America	Europe & N. America
CAL_in	3	1	12	9
CAL_out	1	0	11	0
CAL	109	3	119	116
Banking Crises (borderline)	18	32	24	40
Banking Crises (systemic)	34	76	84	28
Currency Crises	28	64	44	29
Quinn	56	43	60	74
IFIGDP	145	102	150	120
Assets/GDP	63	21	44	53
Liabilities/GDP	82	82	105	66
Gross (FDI+Equity)/GDP	26	15	19	25
Gross Debt/GDP	99	74	121	84
TFP growth	1.122	-1.131	-1.515	0.106
K growth	7.306	3.769	3.075	3.003
Observations	286	508	396	310
Countries	13	24	18	15

Note. Lines 1 and 2 report the number of switches into and out of capital account liberalization (CAL_in and CAL_out). Lines 3-6 report the number of country-years with CAL=1, BC=1, BC=2, CC=1, respectively. Quinn's index of financial liberalization is averaged over 48, 60, 72 and 60 observations only. Continent sample averages are reported for the de-facto indicators (IFIGDP and its components) and the growth rates of TFP and Capital, all expressed as a percentage.

Table 1a
Capital account liberalization and capital stock - yearly panel - difference in difference

	1	2	3	4	5	6	7	8
CAL	-0.039 *	-0.093 ***	-0.084 ***	-0.091 ***	-0.158 ***	-0.139 ***	-0.077 ***	-0.091 ***
	0.023	0.025	0.024	0.026	0.036	0.034	0.028	0.022
CAL*BC				0.014				
				0.019				
CAL*CC				0.009				
				0.041				
CAL*Africa					0.214 *			
					0.119			
CAL*Latin America					0.118 ***			
					0.044			
CAL*LDC's						0.101 **		
						0.043		
CAL post '85							-0.013	
							0.027	
BC			-0.014 *	-0.017 **	-0.012	-0.013 *	-0.014 *	0.021 ***
			0.008	0.009	0.008	0.008	0.008	0.007
CC			0.003	0.001	0.002	0.004	0.003	0.015
			0.015	0.017	0.016	0.016	0.016	0.015
lrgdpch								0.833 ***
								0.041
lgov								0.051 **
								0.021
lprivo								-0.007
								0.015
CAL_switch3		-0.036	-0.035	-0.036	-0.034	-0.032	-0.036	-0.019
		0.023	0.022	0.059	0.022	0.022	0.022	0.021
Time-continent	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	1497	1497	1432	1432	1432	1432	1432	1117
Countries	70	70	70	70	70	70	70	61

Table 1b
Capital account liberalization and TFP- yearly panel - difference in difference

	1	2	3	4	5	6	7	8
CAL	0.124 ***	0.060 ***	0.056 ***	0.056 ***	0.047 *	0.062 **	0.062 ***	0.075 ***
	0.018	0.019	0.019	0.021	0.028	0.027	0.023	0.017
CAL*BC				0.000				
				0.015				
CAL*CC				0.001				
				0.032				
CAL*Africa					0.160 *			
					0.094			
CAL*Latin America					0.004			
					0.036			
CAL*LDC's						-0.009		
						0.033		
CAL post '85							-0.009	
							0.022	
BC			-0.041 ***	-0.041 ***	-0.040 ***	-0.041 ***	-0.041 ***	-0.030 ***
			0.006	0.007	0.006	0.006	0.006	0.006
CC			-0.020 *	-0.020	-0.022 *	-0.020	-0.020	-0.008
			0.012	0.014	0.013	0.013	0.013	0.011
lrgdpch								0.778 ***
								0.030
lopen								-0.008
								0.016
lprivo								-0.010
								0.011
ipr								0.010 *
								0.007
CAL_switch3		-0.350	0.001	0.001	-0.001	0.001	0.001	0.022
		0.709	0.018	0.018	0.018	0.018	0.018	0.014
Time-continent	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	1461	1461	1398	1398	1398	1398	1398	913
Countries	70	70	70	70	70	70	70	59

Note. The dependent variables are (the logaritm of) the stock of physical capital (log(K)) in Table 1a, and TFP (log(A)) in Table 2a. All regressors are in lagged values. CAL is a de jure dummy indicator of capital account liberalization. The variable CAL_switch3 equals 1 in the 3 years prior to capital account reforms, zero elsewhere. LDC's indicates developing countries. The sample spans between 1975 and 1999. Robust standard errors are reported below each coefficient. *, ** and *** indicate significance at 10, 5 and 1 per cent confidence level respectively.

Table 2a
International Financial Liberalization and capital stock - yearly panel - difference in difference

	1	2	3	4	5	6	7
IFL = CAL		-0.139 ***			-0.139 ***		-0.272 ***
		0.028			0.022		0.030
IFL = IFIGDP	-0.019 ***	-0.056 ***	-0.008	-0.018 *		-0.019 **	-0.160 ***
	0.006	0.012	0.011	0.010		0.009	0.024
IFIGDP*CAL		0.056 ***					0.155 ***
		0.014					0.023
IFL*Africa			-0.176 ***				
			0.028				
IFL*Latin America			0.001				
			0.014				
IFL*LDC's				-0.001			
				0.013			
BC	-0.010	-0.013	-0.007	-0.010	-0.017	-0.011	-0.007
	0.008	0.008	0.008	0.008	0.014	0.013	0.014
CC	0.011	0.008	0.017	0.011	0.003	0.020	0.002
	0.017	0.016	0.016	0.017	0.017	0.018	0.017
Time-continent	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P
Obs	1521	1360	1521	1521	1431	1462	1325
Countries	67	67	67	67	54	54	54

Table 2b
International Financial Liberalization and TFP - yearly panel - difference in difference

	1	2	3	4	5	6	7
IFL = CAL		-0.047 **			0.037 ***		-0.056 ***
		0.021			0.014		0.019
IFL = IFIGDP	-0.015 ***	-0.089 ***	0.021 ***	0.023 ***		0.005	-0.095 ***
	0.005	0.009	0.008	0.008		0.006	0.015
IFIGDP*CAL		0.100 ***					0.103 ***
		0.010					0.015
IFL*Africa			-0.125 ***				
			0.022				
IFL*Latin America			-0.049 ***				
			0.011				
IFL*LDC's				-0.059 ***			
				0.010			
BC	-0.033 ***	-0.027 ***	-0.029 ***	-0.030 ***	-0.046 ***	-0.051 ***	-0.038 ***
	0.006	0.006	0.006	0.006	0.009	0.009	0.009
CC	-0.019	-0.016	-0.016	-0.018	-0.026 ***	-0.020 *	-0.028 ***
	0.013	0.013	0.013	0.013	0.011	0.011	0.011
Time-continent	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P
Obs	1492	1333	1492	1492	1390	1438	1303
Countries	67	67	67	67	54	54	54

Note. The dependent variables are the logaritm of the stock of physical capital (log(K)) in Table 1a, and of TFP (log(A)) in Table 2a. All regressors are in lagged values. CAL is a de jure dummy indicator of capital account liberalization. IFIGDP is (Total Foreign Assets+Liabilities)/GDP. The variable CAL_switch3 is included in the regressions of columns 4, 7 and 9. Crises source CK-GH refers to the banking and currency crises indicators of Caprio and Klingebiel (2003) and Glick and Hutchison (2000) respectively. Crises source BEKM-P refers to the banking and currency crises indicators of Bordo et al. (2000). The sample spans between 1975 and 1999. Robust standard errors are reported below each coefficient. *, ** and *** indicate significance at 10, 5 and 1 per cent confidence level respectively.

Table 3a
Capital account liberalization and the capital stock - yearly panel - difference in difference

	1	2	3	4	5	6	7
	Bertrand et al. (2004) correction		No closed countries	Full Sample	Full Sample	Full Sample	Full Sample
CAL		-0.083 ***			-0.090 ***	-0.093 ***	-0.081 ***
		0.014			0.026	0.026	0.027
CAL_off			0.036 *	0.082 ***			
			0.02	0.019			
BC	0.020 ***		0.041 ***	0.021 ***	0.013	0.013	0.014 *
	0.008		0.009	0.007	0.008	0.008	0.008
CC	0.017		0.009	0.015	0.012	0.012	0.012
	0.015		0.021	0.015	0.015	0.015	0.015
lrgdpch	0.836 ***		0.719 ***	0.834 ***	0.888 ***	0.888 ***	0.909 ***
	0.043		0.057	0.041	0.049	0.049	0.051
lprivo	-0.010		0.029	-0.007	-0.024	-0.024	-0.026
	0.015		0.019	0.015	0.016	0.016	0.017
lgov	0.051 **		0.026	0.051 **	0.023	0.021	0.024
	0.022		0.037	0.021	0.026	0.026	0.026
CAL_switch_in3					-0.037		
					0.023		
CAL_switch_out3					0.025		
					0.033		
CAL_switch_in_trend						-0.017	
						0.011	
CAL_switch_out_trend						0.005	
						0.015	
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-continent	Yes	No	Yes	Yes	Yes	Yes	Yes
Country pre-IFL trend	No	No	No	No	No	No	Yes
Obs	1060	317	465	1117	875	875	814
Countries	61	17	31	61	59	59	57

Table 3b
Capital account liberalization and TFP - yearly panel - difference in difference

	1	2	3	4	5	6	7
	Bertrand et al. (2004) correction		No closed countries	Full Sample	Full Sample	Full Sample	Full Sample
CAL		0.077 ***			0.069 ***	0.072 ***	0.062 ***
		0.013			0.019	0.019	0.020
CAL_off			-0.039 **	-0.062 ***			
			0.02	0.015			
BC	-0.030 ***		-0.041 ***	-0.030 ***	-0.029 ***	-0.028 ***	-0.028 ***
	0.006		0.009	0.006	0.006	0.006	0.006
CC	-0.006		-0.005	-0.007	-0.009	-0.010	-0.008
	0.011		0.019	0.011	0.011	0.011	0.011
lrgdpch	0.778 ***		0.800 ***	0.777 ***	0.755 ***	0.755 ***	0.746 ***
	0.031		0.056	0.030	0.035	0.035	0.036
lprivo	-0.007		0.019	-0.010	-0.003	-0.004	-0.003
	0.011		0.017	0.011	0.012	0.012	0.012
lopenk	-0.008		0.011	-0.007	0.003	0.003	0.000
	0.016		0.029	0.016	0.018	0.018	0.018
ipr	0.011		0.004	0.010	0.012 *	0.012 *	0.012 *
	0.007		0.012	0.007	0.007	0.007	0.007
CAL_switch_in3					0.020		
					0.016		
CAL_switch_out3					0.005		
					0.024		
CAL_switch_in_trend						0.008	
						0.008	
CAL_switch_out_trend						0.009	
						0.011	
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-continent	Yes	No	Yes	Yes	Yes	Yes	Yes
Country pre-IFL trend	No	No	No	No	No	No	Yes
Obs	934	291	375	931	814	814	814
Countries	59	17	29	59	57	57	57

Note. The dependent variables are the logaritms of the stock of physical capital (log(K)) in Table 1c, and of TFP (log(A)) in Table 2c. All regressors are in lagged values. The indicator CAL_out takes value 1 if the country is financially closed as a result of a closing reform. The variables CAL_switch_in3 and IFL_switch_out3 equal 1 in the 3 years prior to capital account opening and closing, respectively. The same variables with _trend termination take value 1, 2 and 3 respectively 3, 2 and 1 year prior to reform. The sample spans between 1975 and 1999. All regressions include a constant. Standard errors are clustered by country. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively.

Table 4a
Capital account liberalization and Capital accumulation - cross-section

	1	2	3	4	5	6	7
k_25	-0.300 ***	-0.293 ***	-0.293 **	-0.412 ***	-0.279 **	-0.531 ***	-0.432 **
	0.115	0.113	0.115	0.138	0.125	0.185	0.216
CAL	0.736	0.707	0.759	2.035	0.508	-0.006	-0.119
	0.789	0.832	1.196	1.295	0.895	0.847	0.826
CAL*Africa				4.395			
				7.182			
CAL*Latin America				-3.688 ***			
				1.333			
CAL*LDC's					0.395		
					1.567		
BC		-0.692	-0.666	0.039	-0.730	0.190	0.199
		1.079	1.212	1.217	1.096	1.274	1.216
CC		1.758	1.846	1.605	1.678	5.136	3.124
		4.841	4.964	5.319	4.746	5.617	5.028
CAL*BC			-0.121				
			3.410				
CAL*CC			-0.098				
			1.288				
gadp							-0.606
							0.421
lprivo						1.194 **	1.702 **
						0.553	0.681
lopenk						-1.005	-0.836
						0.639	0.623
lgov						0.132	-0.258
						0.576	0.597
R2	0.066	0.071	0.071	0.139	0.073	0.191	0.229
Obs	69	69	69	69	69	63	63

Table 4b
Capital account liberalization and TFP Growth - cross-section

	1	2	3	4	5	6	7
a_25	-0.275	-0.354	-0.329	-0.405	-0.401	-0.907 *	-1.031 **
	0.357	0.554	0.399	0.377	0.394	0.479	0.495
CAL	0.680 *	0.554	0.118	1.369 **	1.130 **	-0.266	-0.177
	0.420	0.434	0.834	0.556	0.566	0.365	0.387
CAL*Africa				10.502 **			
				4.211			
CAL*Latin America				-2.473 ***			
				0.668			
CAL*LDC's					-1.125 *		
					0.600		
BC		-1.492	-1.852	-0.971	-1.448	-1.386	-1.292
		0.954	1.078	1.011	0.949	0.943	0.979
CC		-2.107	-1.896	-3.048	-2.092	-1.938	-1.660
		3.765	4.566	3.837	3.703	3.555	3.794
CAL*BC			2.189				
			1.586				
CAL*CC			-3.786				
			6.402				
gadp							0.272
							0.236
lprivo						0.903 ***	0.657 *
						0.262	0.352
lopenk						0.229	0.166
						0.319	0.386
ipr						0.203	0.151
						0.397	0.434
R2	0.032	0.109	0.126	0.197	0.133	0.313	0.334
Obs	65	65	65	65	65	58	57

Note. The dependent variables are the 25-year average annual growth rates of physical capital (100*dlog(K)/25) in Table 3a, and of TFP (100*dlog(A)/25) in Table 4a. All regressors are expressed as period average, except for the logaritm of the initial capital stock and TFP level. CAL is the de jure dummy indicator of capital account liberalization averaged over the sample period. The sample spans between 1975 and 1999. All regressions include a constant. Robust standard errors are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively.

Table 5a
International Financial Liberalization and Capital accumulation - cross-section

	1	2	3	4	5	6	7	8	9	10	11
k_25	-0.287 **	-0.421 ***	-0.561 ***	-0.371 **	-0.346 **	-0.654 ***	-0.194	-0.329 *	-0.376 **	-0.411 **	-0.280
	0.127	0.133	0.155	0.145	0.148	0.171	0.195	0.182	0.191	0.206	0.191
IFL = CAL		-1.063							0.636	-0.479	
		1.333							0.907	1.579	
IFL = IFIGDP	0.048	-1.549 **	0.281 **	0.154				0.034		-1.045	
	0.217	0.656	0.121	0.201				0.259		1.025	
IFIGDP*CAL		1.638 **								1.079	
		0.683								1.033	
IFL = Quinn					-0.361	0.056	-0.061				-0.686
					0.937	0.918	0.965				0.997
IFL*Africa			-1.482 **			-0.520 **					
			0.737			0.246					
IFL*Latin America			-0.773 **			-0.628 ***					
			0.327			0.189					
IFL*LDC's				-0.365			0.346				
				0.274			0.251				
BC	-0.714	-0.418	-0.369	-0.421	-1.703	-0.249	-2.448 *	-1.026	-0.555	-1.171	-1.619
	1.113	1.083	1.104	1.166	1.178	1.264	1.319	2.453	2.488	2.607	2.513
CC	1.088	-1.086	0.979	0.435	2.354	2.161	2.757	-5.901 *	-5.501	-5.994	-5.555
	4.887	5.000	4.889	5.031	4.965	5.188	4.894	3.497	3.529	3.646	3.896
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P	BEKM-P
R2	0.062	0.144	0.162	0.077	0.120	0.261	0.155	0.100	0.111	0.138	0.097
Obs	66	66	66	66	59	59	59	54	54	54	52

Table 5b
International Financial Liberalization and TFP Growth - cross-section

	1	2	3	4	5	6	7	8	9	10	11
a_25	-0.338	-0.167	-0.491	-0.567	-0.988 **	-0.637	-1.137 **	-0.687 **	-0.669 **	-0.708 *	-0.889 **
	0.475	0.379	0.411	0.437	0.500	0.452	0.480	0.334	0.333	0.365	0.427
IFL = CAL		-1.382 **							0.273	0.156	
		0.603							0.383	0.749	
IFL = IFIGDP	0.031	-1.565 ***	0.269 ***	0.266 ***				0.191 **		0.252	
	0.198	0.450	0.096	0.100				0.087		0.667	
IFGDP*CAL		1.675 ***								-0.075	
		0.467								0.666	
IFL = Quinn					1.261 *	1.232 *	0.762				0.879
					0.741	0.664	0.745				0.578
IFL*Africa			-0.987 **			-0.091					
			0.455			0.139					
IFL*Latin America			-0.704 **			-0.398 ***					
			0.280			0.089					
IFL*LDC's				-0.748 **			-0.312 ***				
				0.289			0.098				
BC	-1.550	-1.338 *	-1.378 *	-1.162	-1.803 *	-0.862	-1.291	-2.544 *	-2.646 *	-2.468 *	-3.148 **
	0.996	0.712	0.819	0.815	1.034	0.984	0.991	1.380	1.420	1.416	1.353
CC	-1.499	-3.561	-1.839	-2.921	-0.586	-1.978	-1.279	-4.851 ***	-5.453 ***	-4.806 ***	-4.558 **
	3.799	3.519	3.397	3.101	3.980	3.758	3.677	1.592	1.525	1.699	1.745
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P	BEKM-P
R2	0.088	0.278	0.291	0.269	0.198	0.354	0.287	0.280	0.319	0.281	0.287
Obs	63	63	63	63	56	56	56	52	52	52	50

Note. The dependent variables are the 25-year average annual growth rates of physical capital (100*dlog(K)/25) in Table 3b, and of TFP (100*dlog(A)/25) in Table 4b. All regressors are expressed as period average, except for the logaritm of the initial capital stock and TFP level. CAL is a de jure dummy indicator of capital account liberalization, Quinn is a de jure indicator of capital account liberalization valued in [0,100], IFIGDP measures de facto financial integration. Crises Source CK-GH refers to the banking and currency crises indicators of Caprio and Klingebiel (2003) and Glick and Hutchison (2000) respectively. Crises Source BEKM-P refers to the banking and currency crises indicators of Bordo et al. (2000). The sample spans between 1975 and 1999. All regressions include a constant. Robust standard errors are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively.

Table 6a
Capital account liberalization and Capital accumulation - Dynamic Panel Data - System GMM

	1	2	3	4	5	6
k_5	0.937 ***	0.958 ***	0.932 ***	0.974 ***	0.951 ***	0.963 ***
	0.032	0.020	0.021	0.018	0.022	0.021
CAL	0.088	0.019	-0.002	0.034	0.092	0.005
	0.062	0.054	0.055	0.052	0.068	0.071
CAL*BC				-0.004		
				0.087		
CAL*CC				-0.406		
				0.347		
CAL*Africa					-0.014	
					0.073	
CAL*Latin America					-0.124	
					0.089	
CAL*LDC's						0.070
						0.108
BC		-0.124 ***	-0.049 *	-0.111 ***	-0.104 ***	-0.109 ***
		0.045	0.025	0.036	0.039	0.039
CC		-0.336	-0.164	-0.268	-0.233	-0.254
		0.222	0.185	0.181	0.169	0.175
lgov			-0.039			
			0.060			
lprivo			0.132 ***			
			0.040			
lopenk			-0.023			
			0.092			
Sargan (p-val)	0.318	0.653	0.998	0.778	0.853	0.464
m2 (p-val)	0.780	0.324	0.723	0.31	0.391	0.277
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	344	344	278	344	344	344
Countries	70	70	61	70	70	70

Note. The dependent variables are the 5-year log-difference and the log of the end-of-period level of capital stock. All regressors are log differences and levels of 5-year period averages. The sample spans between 1975 and 1999. All regressions include a constant. The estimation is performed with the two-step system-GMM procedure. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step.

Table 6b
Capital account liberalization and TFP - Dynamic Panel Data - System GMM

	1	2	3	4	5	6
a_5	0.732 ***	0.737 ***	0.711 ***	0.785 ***	0.739 ***	0.707 ***
	0.106	0.101	0.083	0.095	0.096	0.098
CAL	0.191 ***	0.187 **	0.118 *	0.264 ***	0.192 ***	0.263 ***
	0.071	0.081	0.070	0.089	0.064	0.072
CAL*BC				-0.130 *		
				0.078		
CAL*CC				-1.345 *		
				0.592		
CAL*Africa					0.134	
					0.086	
CAL*Latin America					-0.165 ***	
					0.089	
CAL*LDC's						-0.253 **
						0.101
BC		-0.106 **	-0.072 *	-0.073 *	-0.099 **	-0.089 **
		0.049	0.039	0.045	0.043	0.041
CC		0.501	-0.040	0.549	0.135	-0.006
		0.438	0.277	0.466	0.286	0.328
lopenk			-0.012			
			0.082			
lprivo			0.068			
			0.047			
Sargan (p-val)	0.309	0.488	0.993	0.823	0.920	0.768
m2 (p-val)	0.661	0.724	0.864	0.898	0.959	0.935
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs	331	331	268	331	331	331
Countries	68	68	59	68	68	68

Note. The dependent variables are the 5-year log-difference and the log of the end-of-period level of TFP. All regressors are log differences and levels of 5-year period averages. The sample spans between 1975 and 1999. All regressions include a constant. The estimation is performed with the two-step system-GMM procedure. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step.

Table 7a
International Financial Liberalization and Capital accumulation - DPD - System GMM

	1	2	3	4	5	6	7	8	9	10	11
k_5	0.969 ***	0.962 ***	0.957 ***	0.972 ***	0.958 ***	0.947 ***	0.986 ***	0.971 ***	0.969 ***	0.979 ***	0.994 ***
	0.021	0.019	0.031	0.185	0.018	0.022	0.016	0.019	0.019	0.016	0.013
CAL		-0.047							0.017	-0.068	
		0.061							0.038	0.059	
IFIGDP	-0.004	-0.052	0.005	-0.003				-0.004		-0.067	
	0.008	0.041	0.007	0.009				0.010		0.051	
IFIGDP*CAL		0.053								0.069	
		0.045								0.050	
Quinn					0.022	0.047	0.062				-0.066
					0.056	0.043	0.058				0.044
IFL*Africa			-0.046			0.012					
			0.074			0.018					
IFL*Latin America			-0.030 *			-0.027					
			0.016			0.025					
IFL*LDC's				-0.007			0.034 ***				
				0.012			0.010				
BC	-0.122 ***	-0.080 **	-0.077 ***	-0.109 ***	-0.083 **	-0.054	-0.101 ***	-0.105 ***	-0.096 ***	-0.062 *	0.011
	0.037	0.031	0.030	0.034	0.036	0.039	0.039	0.041	0.039	0.037	0.043
CC	-0.435	-0.443 *	-0.504 *	-0.400	0.113	-0.028	0.021	-0.372 **	-0.343 ***	-0.319 **	-0.077
	0.297	0.023	0.289	0.255	0.200	0.122	0.196	0.151	0.119	0.125	0.102
Sargan (p-val)	0.760	0.728	0.526	0.503	0.427	0.964	0.928	0.748	0.907	0.999	0.968
m2 (p-val)	0.545	0.702	0.617	0.546	0.784	0.845	0.524	0.004	0.001	0.010	0.850
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P	BEKM-P
Obs	332	328	332	332	216	216	216	321	336	336	268
Countries	67	67	67	67	60	60	60	54	54	54	52

Table 7b
International Financial Liberalization and TFP - DPD - System GMM

	1	2	3	4	5	6	7	8	9	10	11
a_5	0.791 ***	0.766 ***	0.777 ***	0.783 ***	0.773 **	0.754 ***	0.665 **	0.609 ***	0.679 ***	0.659 ***	1.000 ***
	0.089	0.081	0.075	0.089	0.117	0.093	0.129	0.114	0.108	0.114	0.062
CAL		0.062							0.142 **	0.127	
		0.075							0.061	0.091	
IFIGDP	0.021 **	-0.059 *	0.026 ***	0.038 ***				0.024 **		-0.019	
	0.010	0.034	0.009	0.014				0.009		0.070	
IFIGDP*CAL		0.075 **								0.027	
		0.036								0.065	
Quinn					0.138 *	0.057	0.040				-0.024
					0.074	0.069	0.099				0.073
IFL*Africa			-0.115 **			-0.038					
			0.046			0.034					
IFL*Latin America			-0.023 **			-0.057 **					
			0.009			0.025					
IFL*LDC's				-0.029 **			-0.055 *				
				0.014			0.029				
BC	-0.065		-0.038	-0.073	-0.055	-0.067	-0.029	-0.098	-0.155 **	-0.127 *	-0.124 *
	0.053		0.038	0.049	0.068	0.069	0.057	0.064	0.067	0.070	0.064
CC	0.412		-0.095	0.183	-0.047	0.049	-0.062	-0.291	-0.266 *	-0.366 **	-0.354 **
	0.451		0.274	0.315	0.272	0.217	0.263	0.215	0.149	0.187	0.172
Sargan (p-val)	0.526	0.932	0.770	0.594	0.866	0.995	0.925	0.846	0.941	0.999	0.998
m2 (p-val)	0.919	0.765	0.766	0.908	0.364	0.540	0.459	0.890	0.418	0.839	0.038
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Crises Source	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	CK-GH	BEKM-P	BEKM-P	BEKM-P	BEKM-P
Obs	321	317	321	321	209	209	209	313	328	308	261
Countries	65	65	65	65	59	59	59	53	53	53	51

Note. The dependent variables are the 5-year log-difference and the log of the end-of-period level of the capital stock in Table 5b and of TFP in Table 6b. All regressors are log differences and levels of 5-year period averages. Crises Source CK-GH refers to the banking and currency crises indicators of Caprio and Klingebiel (2003) and Glick and Hutchison (2000) respectively. Crises Source BEKM-P refers to the banking and currency crises indicators of Bordo et al. (2000). The sample spans between 1975 and 1999. All regressions include a constant. The estimation is performed with the two-step system-GMM procedure. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step.

Table 8
International Financial Liberalization and GDP - DPD - System GMM

	1	2	3	4	5	6	7	8	9	10
	Crises	Crises	Crises	Crises	Crises	Crises	Crises	Crises	Crises	Crises
	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline	Baseline
GDP_5	0.938 ***	0.917 ***	0.922 ***	0.923 **	0.880 ***	0.907 ***	0.960 ***	0.898 ***	0.922 ***	0.905 ***
	0.031	0.034	0.036	0.032	0.033	0.038	0.027	0.033	0.036	0.031
IFL = CAL	0.022	0.136	0.143							-0.030
	0.113	0.136	0.159							0.140
IFL = Quinn				0.407 **	0.339 ***	0.393 ***				
				0.175	0.126	0.162				
IFL = IFIGDP							0.032 **	0.036 *	0.034 **	-0.002
							0.016	0.019	0.017	0.061
IFIGDP*CAL										0.020
										0.070
BC	-0.214 ***	-0.166 **	-0.148 **	0.054	0.052	0.061	-0.140	-0.110	-0.106	-0.191 **
	0.075	0.068	0.072	0.100	0.082	0.101	0.112	0.091	0.112	0.084
CC	-1.073 **	-0.919 ***	-1.123 ***	-1.078 **	-0.847 ***	-1.084 **	-1.139 **	-0.857	-0.383	-0.996 *
	0.479	0.337	0.379	0.425	0.209	0.409	0.457	0.542	0.498	0.567
IFL*Africa		0.060			-0.006			-0.084		
		0.167			0.024			0.068		
IFL*Latin America		-0.280			-0.097 **			-0.072 *		
		0.182			0.039			0.039		
IFL*LDC's			-0.211			-0.019			-0.050	
			0.191			0.029			0.034	
Sargan (p-val)	0.499	0.936	0.451	0.798	0.999	0.979	0.721	0.575	0.533	0.786
m2 (p-val)	0.157	0.154	0.163	0.931	0.546	0.466	0.161	0.163	0.163	0.164
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs	337	337	337	216	216	216	341	341	341	337
Countries	69	69	69	60	60	60	69	69	69	69

Note. The dependent variable is the 5-year log-difference and the log of the end-of-period real GDP. All regressors are log-differences and levels of 5-year period averages. The sample spans between 1975 and 1999. All regressions include a constant. The estimation is performed with the two-step system-GMM procedure. Coefficients and standard errors are reported from the first step. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step.

Table 9a

Capital account liberalization and financial crises

Panel A: Full Sample				
	1	2	3	4
	Any BC	Borderline BC	Systemic BC	Currency
CAL	0.060	0.017 **	-0.031	-0.017
	1.120	2.080	-0.630	-0.800
depins	0.096 *	-0.003	0.099	0.000
	1.650	-0.510	1.500	-0.020
rgdpch	-0.084 ***	0.001	-0.085 ***	-0.019 *
	-2.790	0.250	-2.560	-1.730
inflation	0.011 ***	-0.038 **	0.010 ***	-0.002
	2.530	-2.200	2.790	-0.640
openk	0.039	0.009 *	0.003	0.031 **
	1.100	1.770	0.080	2.200
grprivo	-0.325 ***	-0.015	-0.275 ***	-0.153 **
	-3.390	-1.070	-3.610	-2.300
Pseudo R2	0.051	0.072	0.087	0.024
Obs	1077	1077	1077	1039
Panel B: Developed Countries				
	Any BC	Borderline BC	Systemic BC	Currency
CAL	0.399 ***	0.003 ***	0.029	0.061 **
	4.850	2.890	0.250	2.270
depins	0.078	0.003 **	-0.113	-0.027
	0.660	2.290	-0.620	-1.510
rgdpch	-0.129 **	0.000	-0.131 ***	-0.029 ***
	-2.200	0.720	-2.550	-3.060
inflation	0.166 ***	-0.001	0.164 ***	-0.029
	3.400	-0.500	3.100	-0.690
openk	0.209 ***	0.002 ***	0.006	0.045 **
	2.670	3.070	0.090	2.400
grprivo	0.209	0.002 *	0.085	0.015
	0.600	1.830	0.290	0.190
Pseudo R2	0.157	0.381	0.263	0.054
Obs	283	283	283	258
Panel C: Developing Countries				
	Any BC	Borderline BC	Systemic BC	Currency
CAL	-0.015	0.006	-0.035	-0.036
	-0.260	0.340	-0.630	-1.590
depins	0.131 *	-0.034 **	0.218 ***	0.010
	1.900	-2.460	3.120	0.460
rgdpch	-0.100 ***	0.002	-0.099 ***	-0.018
	-2.570	0.270	-2.560	-1.330
inflation	0.005 **	-0.048	0.006 **	0.000
	2.030	-1.580	2.300	0.020
openk	0.001	0.009	-0.005	0.021
	0.030	0.950	-0.110	1.250
grprivo	-0.573 ***	-0.035	-0.476 ***	-0.258 ***
	-4.400	-1.330	-4.130	-3.550
Pseudo R2	0.067	0.064	0.094	0.036
Obs	794	794	794	781

Note. The dependent variables are the indicators of banking and currency crises, that equals 1 if a crisis of a certain type (any banking crisis, borderline BC, systemic BC or currency crisis) occurs, 0 otherwise. All regressors are in lagged values. The estimation is performed on yearly observations with probit, and the coefficients quantify marginal effects. Standard errors are clustered by country and z-statistics are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent respectively.

Table 9b
International Financial Liberalization and financial crises - yearly panel - dprobit
Panel A

	Any Banking Crisis			Currency Crises		
	1	2	3	4	5	6
	Full Sample	Developed	Developing	Full Sample	Developed	Developing
Quinn	0.164 **	0.365	0.108	-0.012	0.068	-0.029
	2.050	1.310	1.100	-0.270	0.860	-0.420
Pseudo R2	0.046	0.149	0.035	0.009	0.062	0.009
Obs	455	164	291	381	129	252
IFIGDP	0.008	0.117 ***	-0.009	-0.040 **	-0.012	-0.067 ***
	0.380	2.770	-0.560	-2.040	-0.720	-3.700
Pseudo R2	0.040	0.120	0.048	0.036	0.043	0.052
Obs	1165	315	850	1074	270	804

Panel B

	Systemic Banking Crises			Borderline Banking Crises		
	1	2	3	4	5	6
	Full Sample	Developed	Developing	Full Sample	Developed	Developing
Quinn	-0.013	0.095	-0.001	0.222 ***	0.304 ***	0.079 ***
	-0.220	1.110	-0.020	4.720	2.640	3.960
Pseudo R2	0.101	0.666	0.056	0.107	0.223	0.183
Obs	455	164	291	455	164	291
IFIGDP	0.010	0.107 ***	-0.007	-0.002	-0.002	-0.002
	0.600	3.070	-0.540	-0.840	-0.330	-0.650
Pseudo R2	0.071	0.292	0.070	0.048	0.228	0.054
Obs	1165	315	850	1165	315	850

Note. The dependent variables are the indicators of banking and currency crises, that equal 1 if a crisis of a certain type (any banking crisis, borderline BC, systemic BC or currency crisis) occurs, 0 otherwise. All covariates of Table 9a, except CAL, are included but not reported. All regressors are in lagged values. The estimation is performed on yearly observations with probit, and the coefficients quantify marginal effects. Standard errors are clustered by country and z-statistics are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent respectively.

Table 9c
International Financial Liberalization and financial crises - yearly panel - dprobit

Panel A

	Any Banking Crisis			Currency Crises		
	1	2	3	4	5	6
	Full Sample	Developed	Developing	Full Sample	Developed	Developing
CAL_5year	0.057	0.312 ***	0.004	-0.029	0.031	-0.045
	1.200	3.860	0.060	-1.200	1.160	-1.550
Pseudo R2	0.053	0.130	0.059	0.021	0.042	0.029
Obs	1229	315	914	1098	270	828
Quinn_5year	0.077	0.209	0.033	-0.024	0.005	-0.047
	1.530	1.210	0.480	-0.910	1.200	-1.330
Pseudo R2	0.350	0.123	0.021	0.021	0.066	0.035
Obs	823	252	571	741	210	531
IFIGDP_5year	0.009	0.095 ***	-0.008	-0.032 *	-0.006	-0.065 ***
	0.450	2.690	-0.530	-1.800	-0.490	-3.350
Pseudo R2	0.043	0.115	0.048	0.032	0.040	0.049
Obs	1165	315	850	1074	270	804

Panel B

	Systemic Banking Crises			Borderline Banking Crises		
	1	2	3	4	5	6
	Full Sample	Developed	Developing	Full Sample	Developed	Developing
CAL_5year	-0.009	-0.023	-0.007	0.182	0.055 **	0.002
	-0.200	-0.200	0.056	1.470	2.140	0.120
Pseudo R2	0.073	0.248	0.072	0.047	0.265	0.055
Obs	1229	315	914	1229	315	914
Quinn_5year	-0.042	0.037	-0.074	0.076 ***	0.114 ***	0.076 ***
	-0.960	0.550	-1.050	4.350	2.620	3.320
Pseudo R2	0.058	0.358	0.034	0.121	0.278	0.156
Obs	823	252	571	823	252	571
IFIGDP_5year	0.012	0.091 ***	-0.005	-0.002	-0.005	-0.001
	0.710	3.150	-0.540	-0.910	-0.660	-0.550
Pseudo R2	0.071	0.288	0.007	0.048	0.229	0.054
Obs	1165	315	850	1165	315	850

Note. The dependent variables are the indicators of banking and currency crises, that equal 1 if a crisis of a certain type (any banking crisis, borderline BC, systemic BC or currency crisis) occurs, 0 otherwise. All covariates of Table 9a, except CAL, are included in lagged values but not reported. The indicators of financial integration are the averages of the past 5 years. The estimation is performed on yearly observations with probit, and the coefficients quantify marginal effects. Standard errors are clustered by country and z-statistics are reported below the coefficients. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent respectively.

Table 10a

Panel A. International Financial Liberalization, financial depth and capital

	1	2	3	4	5
	D-i-D	D-i-D	DPD	DPD	DPD
IFL = CAL		-0.092 ***		-0.102	
		0.026		0.065	
IFL = IFIGDP	-0.017 **	-0.028 **	-0.019 **	-0.058	
	0.008	0.012	0.008	0.040	
IFL= Quinn					-0.022
					0.049
IFIGDP*CAL		0.026 *		0.049	
		0.015		0.042	
lprivo	0.045 ***	0.043 ***	0.154 ***	0.140 ***	0.043
	0.015	0.016	0.045	0.041	0.036
Sargan			0.666	0.955	0.912
m2			0.470	0.427	0.914
Time	Yes	Yes	Yes	Yes	Yes
Time-continent	Yes	Yes	No	No	No
Obs	1374	1224	309	305	209
Countries	67	67	67	67	59

Panel B. International Financial Liberalization, financial depth and TFP

	1	2	3	4	5
	D-i-D	D-i-D	DPD	DPD	DPD
IFL = CAL		-0.038 **		-0.029	
		0.019		0.079	
IFL = IFIGDP	-0.026 ***	-0.079 ***	0.006	-0.059 **	
	0.006	0.009	0.010	0.029	
IFL= Quinn					-0.002
					0.076
IFIGDP*CAL		0.077 ***		0.071 **	
		0.011		0.033	
lprivo	0.024 **	0.005	0.071 *	0.060	0.107 **
	0.012	0.012	0.039	0.040	0.044
Sargan			0.693	0.982	0.975
m2			0.77	0.898	0.503
Time	Yes	Yes	Yes	Yes	Yes
Time-continent	Yes	Yes	No	No	No
Obs	1349	1201	300	296	202
Countries	66	66	65	65	58

Note: the dependent variables are physical capital in Panel A and TFP in Panel B, expressed in log in the difference in difference (D-i-D) estimations, in log and log difference in the two-step system GMM dynamic panel (DPD) estimates. Banking and currency crises, and the constant are included in all specifications, the lagged dependent variable is included in the DPD. All regressors in the DPD are log differences and levels of 5-year period averages. The sample spans between 1975 and 1999. DPD coefficients and standard errors are reported from the first step, D-i-D standard errors are robust. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step for the DPD.

Table 10b

International Financial Liberalization and financial depth

	1	2	3	4	5	6	7
	D-i-D	D-i-D	D-i-D	DPD	DPD	DPD	DPD
IFL = CAL	0.134 **		-0.010	0.117		0.401 *	
	0.046		0.052	0.181		0.221	
IFL = IFIGDP		-0.042 ***	-0.131 ***		-0.031	0.028	
		0.015	0.022		0.023	0.054	
IFIGDP*CAL			0.144 ***			-0.06	
			0.028			0.064	
IFL= Quinn							0.706 ***
							0.151
Sargan				0.786	0.555	0.841	0.767
m2				0.650	0.676	0.637	0.242
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time-continent	Yes	Yes	Yes	No	No	No	No
Obs	1291	1239	1239	289	290	287	193
Countries	70	67	67	65	64	64	56

Note: the dependent variable is private credit over GDP, expressed in log in the difference in difference (D-i-D) estimations, in log and log difference in the two-step system GMM dynamic panel (DPD) estimates. Banking and currency crises, and the constant are included in all specifications, the lagged dependent variable is included in the DPD. All regressors in the DPD are log differences and levels of 5-year period averages. The sample spans between 1975 and 1999. DPD coefficients and standard errors are reported from the first step, D-i-D standard errors are robust. *, ** and *** indicate that a coefficient is significant at 10, 5 and 1 per cent, respectively. The p-values for the Sargan overidentification test and the second order serial correlation (m2) test are reported from the second step for the DPD.

Table 11

Financial integration and volatility - Cross-section (1975-1999)

	sd(dlogGDP)				sd(dlogTFP)			
	1	2	3	4	5	6	7	8
IFL=CAL	-2.864 **		2.421		-3.972 **		2.382	
	1.439		2.274		1.826		4.814	
IFL=IFIGDP		-0.345	3.963 ***			0.355	6.357	
		0.332	0.979			0.435	5.929	
IFIGDP*CAL			-4.410 ***				-6.033	
			1.011				5.906	
IFL=Quinn				-1.650				-2.895 ***
				1.519				1.038
BC	7.129 ***	7.406 ***	6.750 ***	8.981 ***	-0.817	-0.511	-1.499	-0.17
	2.475	2.660	2.072	2.802	2.365	2.145	3.055	1.345
CC	-5.689	-5.703	-1.013	-7.444	-11.075	-3.805	2.583	-4.708
	9.868	9.241	8.148	10.086	8.453	7.220	9.71	5.436
R2	0.205	0.163	0.334	0.232	0.035	0.010	0.131	0.134
Obs	67	67	67	59	70	67	67	60

Note: OLS cross-sectional regressions of the standard deviation of real GDP growth and TFP on the means of the IFL indicators, banking and currency crises, 1975-1999. Standard errors are reported in parenthesis. ***, ** and * indicate that coefficients are significant at 1, 5 and 10 per cent, respectively.